THE

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A Monthly Magazine of Practical Information and Useful Discussions

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The Wealth of India.

The object of this Monthly is to publish the views of experts on the various problems bearing on material progress, specially agriculture, commerce, industry, economics, co-operation, banking, insurance, popular, scientific and technical education, to digest the notable articles appearing in the leading magazines and periodicals and generally to serve as a record of practical information, and useful discussions. It is believed such a publication is indispensable to statesman, publicists, businessmen, students of economics and all others interested in the material and moral advancement of the country.

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Current Topics

BY ECONOMICUS.

Surplus Cash Balances.

IN spite of the fact that the Royal Commission on Indian Finance and Currency is sitting and is considering, among other questions, the one in connection with the surplus cash balances in the treasuries of the Government of India and the stringency of the money market, that subject was discussed between the Bombay Chamber of Commerce and Sir William Meyer, when the Finance Member visited the capital of the Western Presidency some time ago. Merchants in Bombay hold very strong views in the matter, and lay the tightness of money mainly at the door of the policy of Government which withdraws large amounts from the market and locks them up in its treasuries. Whatever relevance of truth there may be in the remark of the *Statesman* that "in spite of the magnitude of the Government balances, Bombay has managed to finance a huge speculation in silver, which was certainly not organized for the benefit of India," the case of the Bombay critics of the policy of Government, is certainly strong. It was, of course, futile to ask the Finance Member to strike out any new line of general financial policy while a Royal Commission is investigating the whole problem of Indian finance and the Bombay Chamber was conscious of this. That body, however, ventured, under the exceptional circumstances of the present, to anticipate one of the recommendations of the Commission in asking Sir

William to place more Government funds at the disposal of the money market. The exceptional circumstances are the curtailment of the usual supplies of money, due, the Bombay Chamber believes, in a great measure, to the action of Government above referred to and the continued tightness of money in London which prevents the remittance of gold to India. The coming season in India is expected to prove one of bumper harvests and the Bank rate has already begun to move upwards. Unless, therefore, Government come to the rescue of trade by releasing some of their surplus balances, an acute stringency is apprehended in the near future. This tightness is, no doubt, relieved to some extent, by Council remittances but it must be borne in mind that the proceeds of the Council bills are mainly used to finance the produce of the country after it reaches the seaports and what is required is money in the hands of the banks to accommodate traders who handle the crops in the districts. Some idea of the stringency of money may be obtained if it is noted that while at the present time Government hold over 32 crores in their Civil treasuries, an amount in excess of the normal by nearly 15 crores, bank balances are being depleted, the discount rate has risen to 5 per cent. and bankers are anxious borrowers to provide funds for the coming season. The contention that to ease the money market here would interfere with the sale of Council remittances that have been budgeted for, was met by Sir Charles Armstrong by saying that this is not likely in a year when the balance of trade is certain to be a large one in favour of India. He bespoke the anxiety of the merchants of Bombay which he described as the 'largest bullion, discount and Government Paper market in India and a great centre of commercial activity' at the unfavourable prospect of the money market and appealed to the Finance Member to release a portion of their fat surplus balances now lying idle in the Government's treasuries by placing them at the disposal of the banks.

The Finance Member had, of course, fully xpected this attack and appeal and had armed himself with arguments and statistics for the defence of Government's policy. He was not, however, in a fighting mood; he was firm but conciliaory and friendly.

Sir William's Reply.

He observed that the critics of Government who attribute the scarcity of money they apprehend to their action, are a little unkind to Government. The suggestion as to the larger question of adopting in India the system so familiar in England under which the bulk of the Government moneys are held, until wanted by the State, by a State Bank, cannot now be discussed to any useful end while the Royal Commission is sitting, and was left severely alone by Sir William Meyer; and he proceeded to point out how the general financial situation has materially improved during the last year or so, in that the aggregate balances in England and in India have been steadily diminishing as also the home balances in comparison with those maintained in this country. If the Indian cash balances have increased from Rs. 22·7 crores at the end of July 1911 to Rs. 32·2 crores in July this year, the home balances have gone down from £19 million to £10½ million during the same time. These figures ought to be welcomed, observed Sir William, by those critics of the Secretary of State who have complained that he transfers to himself a far too large portion of the Government balances. He also explained how the enlarged balances in India were mainly due to the Secretary of State's transactions last year in regard to silver purchases. It was merely in fact a remittance transaction between the Secretary of State and the Government of India in the opposite direction to that which usually occurs and diminished the often complained of drain of money from India by means of Council bills. The Finance Member further stated that large as the Indian Treasury balances seemed, they had to serve the needs of Government throughout a continent and the official year had to be commenced with balances amounting to about 18¾ crores. He again contended that Government had been assisting trade by leaving with the Presidency banks more money than they have any obliga-

tion to do. Under the agreements, Government are bound only to maintain a total aggregate amount of 73 lakhs at their head offices, while they have been actually keeping 150 lakhs. It was lastly pointed out that the cash balances had been somewhat increased by the fact that the Secretary of State had not yet drawn Council bills during the present year as fully as was anticipated, and that to certain critics of India Office finance, that ought to be a welcome proposition. Having said this much in defence of the general position, Sir William went on to refer to the special request preferred by the Bombay Chamber, *viz.*, that, as a special case, Government should make a temporary release of some of their balances for the purposes of trade. Without committing himself to anything definite on that question, he promised to give the most careful consideration to the proposal of the Chamber. Before the close of his speech, the Finance Member placed before his audience a few difficulties that must be removed before any action could be taken by Government along the lines indicated and suggested to them a few points for consideration. A general discussion followed the speech but as it has not been reported, one does not know how the members of the Chamber proposed to meet the difficulties placed before them by Sir William Meyer.

The Other Side.

The views expressed by the Bombay Chamber of Commerce do not appear to be universally shared and besides the Government, there is an influential section of the mercantile class and the public which is not prepared to endorse all the criticism indulged in by the Chamber and those who hold identical opinions. It is urged that the attitude taken up by the Finance Member was satisfactory inasmuch as he did not yield to the loud clamour raised by a small interested section. The Government are trustees of the interests of the whole country and they have to see that concessions to a body of people are not detrimental to the interests of the mass. They must also walk warily in such delicate transactions of a financial nature and take into consideration a variety of factors that go to make up the situation. In the first place, it must be definitely proved that a stringency of the money market is a certainty and that things have not been exaggerated; secondly, a connection between such tightness of money and the cash balances in the treasuries of Government must be clearly established and their responsibility in the matter brought home to Government. And thirdly, the public must be assured that no inconvenience or harm will be caused by the release of the cash balances that is urgently demanded. It is stated that whatever may be said in favour of, or against, the existing system of cash balances, the present cry is the cry of a few people and Government ought not to yield to the clamour, however insistent and loud it may be, unless it assures itself of the desirability of the step recommended. Apart from the general aspect of the policy and system involved in the inflated cash balances, Mr. D. E. Wacha strikes the right note when he asks, in a communication to the press, why merchants should look up to Government for the supply of funds to finance the export trade and says that this is nothing less than humiliating. He observes that if the existing banking facilities are inadequate to supply the necessary money for trade purposes, a new bank on a large scale may be started with advantage. There is ample money in the country and if the idea were seriously taken up by men of experience and influence who will inspire confidence in the public mind, it is bound soon to materialise and the bank will prove a success. If such a bank were established, the need for looking up to the Government will be minimised and the required funds placed at the disposal of trade. It must, however, be borne in mind here that the critics of Government contend that the stringency of money is caused by the present financial methods of Government. As a writer puts it, "the balance in the Indian Reserve Treasuries on 31st July, 1910, was Rs. 2,21,59,000. This amount of dormant money is raised by the Govern-

ment on 31st July 1913 to Rs. 16,06,32,065. If the budget is accurate, (and the Finance Minister last week declared that it will be so) then the Reserve Treasury Balances will fall perpendicularly to near the two crore level on or before the end of the present official year. The Government thus arbitrarily disturbs the level of the floating supplies of money in the market and plays havoc with the discount rates." This is the main position of its critics which the Government have got to meet. The suggestion that some of the surplus cash balances in the reserve treasuries ought to be released for the relief of monetary stringency, is further supported by the recent action of the American treasury which offered £10,000,000 to the banks in the cotton districts. In India, the Government has a surplu- cash balance of nearly £9,000,000 while there is a general dearth of funds in the market.

The Poona Conference.

Agriculture promises to make strides in the Bombay Presidency during the *regime* of its new ruler, Lord Willingdon. His Excellency is personally deeply interested in farming, and at the recent Agricultural Conference held at Poona, announced that a home farm was being started at Ganeshkhind, the Governor's residence near Poona. Lord Willingdon observed that the question of rearing good cattle was neglected in this country and the latter were mainly cared for as drought cattle. His Excellency emphasised the importance of rearing good cattle to ensure an adequate supply of pure milk at reasonable rates. Dr. H. H. Mann, Principal, Agricultural College, Poona, submitted a very valuable paper to the conference on the supply of milk in large cities in India and, in fact, this problem of pure milk is becoming more and more serious every day. From the inquiry and the experiments he had made, Dr. Mann discovered that the bulk of the milk sold in Poona city was largely adulterated. The condition of the cattle sheds was found to be most unhealthy and yet the milk was very dear. The bad effects of the supply of impure milk on the public health cannot be overstated and both from the social and the economic point of view, it has become absolutely necessary to take immediate steps to improve the quality of the milk supplied, especially in cities without increasing the price. The remedy lies in starting dairies and locating them at convenient places at a distance from cities. The industry may be started by an individual or a company and is bound to be paying. Besides providing an adequate supply of pure milk at a reasonable price, the industry will give scope to the energies of our young men who will find a new opening. These dairies will, of course, have to be conducted on up-to-date lines. With the facilities of communication we have in these days, distance is no matter and there is a large demand for milk guaranteed to be free from all impurities. Milk forms an important article of diet and the question of its supply deserves very anxious consideration. Lord Willingdon is going to set an example which His Excellency wishes might be followed by the landlords, sardars and others. The Poona Conference showed what work has been and is being done by the Agricultural Department of Bombay in various directions. The most difficult thing to achieve in the matter of agricultural improvement in India is to impress upon the mind of the ignorant and poor cultivator the value of the adoption of modern methods and implements. To attain this end, the Department has started a vernacular class solely for the use of agriculturists' sons and if the experiment succeeds, similar classes may be opened at various centres in the Presidency. In other ways too, the cultivators are being steadily brought to understand and appreciate the profitableness of the use of the improved plough and other implements, the application of rich manure to the soil and the adoption of economical processes and methods. The Poona Conference passed a number of important resolutions one among them relating to a recommendation to Government to empower the district boards to raise at their option an agricultural rate of one pie per rupee on the land revenue every year or a rate

of one anna in the rupee on the land revenue, not more than once in twenty years. Mr. Smart, the Director of Agriculture, has prepared an interesting scheme of agricultural improvement, and under it, the proceeds of the proposed rate are to be used by committees specially appointed for that purpose, on the improvement of agricuture on the model of a system which has succeeded in Ireland. Though the resolution embodying the recommendation was passed by a majority, it was pointed out that an additional rate on land revenue would be felt as a burden by poor cultivators and that in its stead a like rate might be raised with advantage from the excise duty. Several interesting papers bearing upon various aspects of agricultural improvement were submitted to the conference which thus proved a marked success. No less successful was the Provincial Co-operative Conference which followed and was also opened by Lord Willingdon. The proceedings of that conference show how satisfactory is the advance which is being made by that movement and how extensive is the field for its beneficent operations. House-building, sanitation, education and other problems are proposed to be tackled with the help of the co-operative principle. We admire and are pleased with the enthusiasm roused by the co-operative movement. There is undoubtedly a great future before it, but we have to be on our guard against over enthusiasm and the undertaking of unpractical schemes.

Special Articles.

THE PROPOSED COMMERCIAL CONGRESS.

BY SIR P. C. CHATTERJEE, *Kt.*

I have thought over your question and have come to the conclusion that it is most important to separate our economic and industrial interests from the political. It would be better to detach the former from the latter. Thus the industrial conference which is now held as an appendage to the National Congress may with advantage be combined with the proposed Commercial Congress. It is hopeless to expect political advantages until our economic, industrial and social conditions are materially improved.

But I am doubtful whether in a politics-ridden community like the English-educated Indians, any such proposal would be entertained. An Industrial Conference or Commercial Congress apart from the National Congress would evoke little enthusiasm and would probably be not largely attended. We have suffered terribly in the pursuit of politics but this has not damped our ardour though we all know that in the present state of Indian society we should be unable to make proper use of enlarged political rights if they were granted by our rulers.

Still, I would give far greater prominence to social, economic and industrial questions and reduce the National Congress to proper dimension by restricting the meeting to a select number of our best men to discuss questions of *practical* politics alone, and put forth all our strength to improve our condition in respect of the matters first mentioned. After all, educated Indians have not yet taken a very prominent part in these matters and their partial defection would not be fatal to success.

NATURE'S WATER-FINDERS.

BY REV. GEO. N. THOMSSEN, *Bapatla.*

Nature's best water-finders are the roots of plants. When a driven well—which is only a water pipe with a pump at one end and a perforated piece at the other – raises water to the surface of the ground, the roots of various plants will soon discover this interesting work and monopolize the water in the pipe by penetrating the little perforations, and thus deprive man and beast of this life-giving, thirst-quenching fluid. Unless well protected, under ground pipes will become clogged by the roots of plants and all flow of water through them will be stopped. Roots, however, are not only mischievous water finders, but also great benefactors. Floods have often been very destructive in America and other lands, and floods will continue to destroy, until roots come to the rescue. Man foolishly destoys forests and grumbles at the Forest Department, because much land is reserved for forests that seem to be of little or no use. Why not cut down the trees for firewood ? Why not sell all the valuable timbers ? There may be some sense in conserving fruit trees, but of what use are trees that yield nothing but leaves ? So reasons many a man who having eyes sees not, and having ears hears not the wonderful secrets of nature. Some years ago when on a visit to Australia where foolish people, like their foolish brethren in America have wantonly cut down the forests, burning with cruel glee the monarchs of the mountains, we saw with great astonishment fountains of water gush forth from the denuded hillsides. But soon our astonishment was turned into sorrow, for nature's best water-finders, the roots of the trees, had been put out of commission, and as these could no more absorb water, to give life to the trunks, and to the leaves and flowers, and fruits of the trees, alas ! the waters now flowed forth and cut deep ravines along the mountain sides, and, joining other streams in the valleys, destroyed productive farms, inundated towns, killed men and women and children and cattle by drowning and laid waste God's beautiful earth. Not only does man's inhumanity to man make, countless mortals mourn, but also all nature mourns when man's inhumanity and greed destroys the trees of the forests, man's best friends.

But after all, there is a great deal of human nature in the roots of the trees, for it is human nature to keep things dark when one discovers a source of wealth. Likewise the roots keep their source of supply in the dark and do not indicate to others, where they have found their riches. In fact if others seek to discover their source of supply they will quarrel and fight, just like human beings and strangle other roots that seek to get at their riches. Murders in the tree world are not unknown. At times one sees a young tree die, apparently of a decline. If one will take the trouble to dig down to the roots of the suffering tree, he will, in many cases, find that the roots of a strong tree are strangling to death the feeble tree that is struggling to get near the life-giving fountain underground. But not all plants have such a selfish nature. One of the most beautiful and inspiring of all nature's glorious children is the common cane, a most pleasing plant that fills the wanderer in the jungle with wonder and joy. This marvellous clinging, climbing palm, with its evergreen charming fernlike fronds and pretty flowers is not only one of the most beautiful of creepers, but is also one of nature's most unselfish water-finders. The cane-plants need much water to keep them alive and to produce such a wealth of foliage, so they seek for and find copious springs of water, and gleefully, gratefully proclaim to those who have eyes to see and ears to hear that they have found a fountain. By experience and observation, man has learned to listen to this proclamation, and, by digging near the roots of the cane-palm he has found what he needs, more than silver and gold, and has appropriated what is more valuable than rubies and diamonds, namely, a crystal spring of water. If one can use the

divining rod, and by means of this living twig make a survey of the many water-courses underground, he will find that the rod twitches and bends powerfully when he is near this useful plant. He need not uproot the cane however, in order to get at the water, for its roots have not monopolized the spring. If he will only dig he will find water enough and to spare. But any one trying to pull away the cane will find that it has a strong means of defence in the sharp thorns that are almost invisible under its magnificent leaves.

Another water-finder in the vegetable kingdom is a poor tree that is despised, because it is neither beautiful nor useful. It is a kind of Acacia, I believe, at least the Telugus call it the Tella Tumma tree, while the Acacia that yields the useful gum which is often sold as gum arabic is simply called the Tumma tree. The bark of the white or useless Acacia is often peeled off the poor tree, and, when this bark ferments and is distilled it yields a very intoxcating arrack. The tree, however, does not invite man to come and skin it alive in order to distil from its bark a life-destroying liquor, but says to those who will hear ; Come,' I have found water. Dig and you too will find ! Alas, that so few heed this call, and so many cruelly wound this friend of theirs, in order to get what is of no benefit to themselves and so often proves a curse to mankind ! Wherever this tree grows, the divining rod will show that a copious supply of good water can be found. In looking for water, an expert will first of all study the flora of the field. If he sees these trees growing there he at once knows that there are good springs underground. A peculiarity of these trees is that they do not grow in large groves like their brother acacias, so black and thorny, but they seem to straggle all along the way, sometimes in straight lines, again in snake-like curves. This indicates the current which is sure to flow underground along the lines marked out by the poor despised Tella Tumma trees.

But not only do plants such as those mentioned show us where water is to be found, but little insects also that are looked upon as the most destructive pests of the tropics, tell us that they have sought and found what man in his blindness often gropes for in vain. These soft insignificant insects do find their way into every nook and corner of the bungalow. They are more destructive than all the rats in creation. They keep in the dark and will destroy anything that is not as hard as iron or steel. No documents sealed with all the seals of Government are too sacred for them to touch. The policeman with loaded gun may keep away thieves from the Government treasury, but white ants do not fear him nor a host of him. They enter the treasury with impunity, for they circumvent the police by building a tunnel from below, and stamps and paper-money and petitions, even the Collector's orders and the Tahsildar's fulminations they devour with avidity. Yet, after all, greatefully and sincerely, the seeker for water, on field and in the jungle ought to exclaim : bless them ! when he sees the mounds these busy workers have erected, for white ants can live without stamps and paper money and petitions and orders, but they cannot live without water. So they very wisely seek for and find springs of water and over them they build their dwellings where they are fruitful and multiply and fill the jungle with innumerable scavengers that remove all that is dead, both vegetable and animal matter. The divining rod will reveal how wise these little insects are.

Is it not strange that while man can only by cutting deep ditches like the Panama Canal study the hidden things underground, the roots of the trees, of certain plants and even insignificant insects like white ants can find by their instinct the water man needs to make life possible ? This proves how necessary it is to go to nature's heart, in order to win life's best treasures.

Much of the wealth of India lies hidden away in copious supplies of water underground This wealth must be sought and found, and by the use of pumps and engines lifted on to the thirsty land. Here lies an almost unknown source of wealth that has hardly been touched so far.

DYEING IN INDIA.

J. W. COOMBES, B.A. A.M.S.T.

One often meets with a remark in a Visitors' Book kept at a Carpet Factory that so and so is glad to find that only vegetable dyes are used in the Dye-house. Or perhaps an institution praises its manufactured goods by asserting that no aniline colours are used but only indigenous vegetable dyes. This is tantamount to saying that vegetable dyes are superior to aniline and it is assumed that for delicacy of shade, softness and fastness to light and washing, there is no touching the natural product. It is very natural that people who are not in the trade and who have seen only glaring shades of colour produced by aniline and alizarine dyes used in textiles should cry shy of all mineral and coal-tar colours, and the reason why so little attention is paid to fine work is not far to seek. There are very few dyers in England and none at all in India who are sufficiently interested in producing artistic shades by the employment of alizarine dyes. In the first place, trade interests are against it, for, no one would pay the price demanded for soft and beautiful shades, and secondly, dyes which are considered fleeting out here are for all practical purposes fairly fast in a country where the hours of sun-shine are not many and so the dyer is not very much concerned with fastness. Moreover, the dyes required for certain articles like coloured socks or for drapery intended for use only within the house and hardly brought out in the presence of direct sun-light would require ordinary direct dyes. But in India the case is very different. Fastness is the first requisite and it would certainly be worth while for some one to take up the question of dyeing fast shades and artistic shades as well, by means of alizarine colours. The Carpet Industry would always keep up a demand for coloured wools, but whether it would be cheaper to use vegetable dyes or alizarine dyes forthe purpose would have to be considered first, for the production of art shades is no plain sailing—it involves the use of expensive dyes and the process is not as quick as one would imagine. But if, after a comparison of cost, it is found that the vegetable product is higher in price than the coal tar product, then it would certainly look as if the object was to bolster up the indigenous article to maintain that the shades produced by vegetable dyes could not be matched by the employment of aniline and alizarine dyes. But popular opinion, however, has first to be proved to be wrong before any further appreciable increase can be made in the use of foreign dyes.

It is a pity therefore that little care is exercised to produce even a moderately fast dye on cloth. The women walking along the street may be seen wearing self-coloured cloths of bright and glaring shades and with all the indications of being loosely dyed. A fine sense for colour is losing ground and the hideousness and crudeness of present day colours will naturally turn any one against the coal tar products. Coloured yarn used for borders and checks and more particularly black, bleed with the first wash and discolour the entire fabric. One experience of a loose dyed black or blue is sufficient to hinder the demand for such colours and yet not withstanding these drawbacks and defects, one hears of a steady increase in the amount of aniline and alizarine dyes imported into the Madras Presidency while the export of vegetable dyes has fallen in value in three years to half the amount.

If the proper method of dyeing with alizarine dyes is not taught the people, there is a likelihood that the carpet and other indigenous industries will suffer. In fact, one recalls to mind how the carpet industry of a certain jail lost favour with a European firm of importers, because, for the sake of cheapness, the Superintendent of the jail substituted for vegetable colours, the loose fleeting and gaudy shades of aniline colours. It was a mistake to have employed cheap methods of work. Slow processes and expensive dyes are necessary if

good work is to be turned out and then, having once got a market, experiments should have been resorted to with the view of reducing cost of production. The mistake was to have thrown a cheap and inferior article on the market, for once an article receives a bad name, the set back is very great and it takes years, nay, the chance may never come, to set matters right again. It is quite an easy matter to get a shade on cotton, wool or silk, but it is only under expert direction that one can be trusted to attempt successfully the dyeing of fast and delicate shades.

The process may be described shortly:—By the mixture of 3 primary shades, red, blue and yellow in proper proportions, any compound shade is possible. But only fast colours should be used such as rosindaline 2 B for a red, New patent Blue N and Hydrazine 'yellow.' (Or if the Badische Company colours are used, Sorbine Red, alizarine Sapphirole S. E. for a blue and Palatine light Yellow R.). If 17 per cent. of red, 1 per cent. of blue and half per cent. of yellow be mixed together, a nice pink shade is obtained. To get a fine maroon, 50 per cent. of red, 2 of blue and 3 of yellow will be required. In this way, any shade may be obtained and by experiment any colour may be matched. But the exact matching of colours for carpets is not so important except for the purpose of ground work. Fastness and prettiness of shade are essential and the necessary mordants and chemicals tobe used must be familiar to the dyer, as also the correct method of using them. It is a mistake to think however that chemical dyes can replace vegetable at a great saving of cost. The most that can be hoped for at present is approximation of costs of the two methods of work and even then, there would be an advantage as regards variety of shades on the side of the chemical product. Experimental experience alone in time would decide the cheapest way of producing dyed yarn without any detriment to fastness, richness or delicacy. No time should be lost in taking up the subject, for a market flooded with crude and hideous coloured goods, —and they are steadily increasing in quantity every year—finds buyers and a vicious taste sets in and gradually spreads, keeping art work at a low level. It will thus be seen that if the quantity of aniline and alizarine dyes are steadily on the increase, which is a fact, a corresponding attempt should be made to improve the art of colouring, if no permanent injury is to be done to the carpet and other textile industries and if the taste of the people is to be improved.

THE RECENT BANK FAILURES.

BY ECONOMICUS.

Unhappily, we, in India, are not strangers to the sad phenomena of bank failures and the disastrous consequences which follow in their wake. Barring pure accidents, banking business is one which, if properly conducted, has normally no reason to fear any serious catastrophe. Even when a sudden hurricane sweeps over the banking world, credit institutions based upon secure foundations and managed according to correct principles, can weather the storm and come out of the calamity without much serious damage. But it is also a business which lends itself easily to mismanagement, selfish greed and reckless speculation. Joint stock banking is a plant of recent birth in this country and naturally great anxiety is felt lest anything may befall it ere it has taken firm root in the soil. The industrial and economic growth of India is largely dependent upon the development of credit institutions in this country. Industry is limited by capital, the inadequate supply of which is a great stumbling block in the way of our industrial advancement. India is not a rich country and the capital that may be made available in it cannot be considerable when

compared to its size and population. But it has been admitted that there is still much potential capital which is lying hidden and useless and which may be brought out of its lurking places to the certain benefit of indigenous industries. The so called Indian hoards of wealth are, without doubt, exaggerated ; but small rivulets and little sluggish streams of the petty savings of the people will go to create a sufficiently capacious reservoir of capital which is calculated to fertilize the industrial soil and raise a goodly economic crop. This truth has recently been brought home to the mind of the people in this country and the banks and other credit institutions which have risen all over the land, bear witness to the popular consciousness of the importance of the supply of adequate capital and the wholesome change that has come over the public mind. As we have said above, joint stock banking and other institutions of that type are a recent growth in India and hence great solicitude is being felt as to their healthy development. It is from this point of view that many people have looked at the failure of the People's Bank of India and the Amritsar Bank in the Punjab. Both of them were purely Indian concerns and were entirely under Indian management. An attempt seems to have been made to emphasise this aspect of the sad situation that has arisen in Upper India and wholesale criticisms of a hardly fair character have been passed upon Swadeshi banking as such. It is no use minimising the seriousness of the shock that has been dealt to the indigenous credit institutions in general and to public confidence. A strict scrutiny into the affairs of the two banks and the methods of their management will prove a valuable lesson and a salutary corrective. All indiscriminate condemnation of indigenous banks must, however, be deprecated, and in this connection, we must commend the cool headedness and public spirit evinced by responsible people in Northern India in allaying the groundless panic which in such crises spreads like wild fire and causes immense avoidable loss. It is difficult at the present movement to fix the true responsibility and to decide what causes led directly to the collapse of the two Punjab banks. There is a tendency, however, to trace the origin of the calamity to the excessive support which both these institutions are said to have given to local industrial enterprises. The assets of the People's Bank of India in 1912 included, it is stated, a sum of Rs. 4,54,738 due from the Directors and other Officers of the Bank. The ex-managing director, Mr. Harkison Lal who has come in for a deal of hostile criticism, the justice and fairness of which will soon be decided, was also one of the promoters of the Amritsar Bank, the Bharat Insurance Company and many industrial and financial enterprises, whose operations have been the subject of much discussion. We learn from "*Commerce*" that the two banks and an Insurance Company have been utilised as "feeders" for several so called "industrial" undertakings, all practically under one man's control. "Besides its advance to the Lahore Spinning and Weaving Mills, the Amritsar Bank lent two lakhs of rupees to the Pioneer Investment Company which is also said to be a losing concern. The People's Bank of India advanced something like twenty lakhs to the Punjab Cotton Press which, in its turn, purchased shares in the Century and Jumna Flour Mills to the extent of about three lakhs . . . . . stars of less magnitude in this firmament, such as the Punjab Publishing Company, the Pioneer Jewellery Company are alleged to have become extinct. We have, therefore, several limited liability companies, all dovetailed one into the other in a financial sense, each feeding more or less on the other, with two banks and an insurance company as the principal leaders."

THE TWO PUNJAB BANKS.

Whatever one thought of the causes that led to the banking collapse in the Punjab, it is pleasing to note that in spite of the 'personal local feelings and factious opposition' of people who are alleged to have waged a 'bitter and persistent campaign against Lala Harkison Lal and the concerns under his direction' and in spite of the feeling of resentment at the

grievous loss that has occurred to thousands of poor and helpless depositors and their families, the sober and responsible opinion as reflected in the press and in meetings was inclined to counsel measures calculated to arrest the spreading panic, to reorganise the shaken credit and, by joint effort, to minimise the shock that Swadeshi finance and enterprise in Northern India has sustained. An idea of the magnitude of the operations and funds of the two Lahore banks may be had from the following figures. The People's Bank of India was registered in 1901 with a small subscribed capital which was increased to Rs. 5,00,000 in 1904, to Rs. 10,00,000 in 1907 and to Rs. 22,00,000 in 1910. The paid up capital was Rs. 73,145 in 1903 and Rs. 12,48,000 in 1912, while the reserve fund increased from Rs. 10,000 ten years ago to Rs. 3,25,000 last year. The deposits in 1912 amounted to Rs. 1,27,65,704 and the bank has been giving increasing dividends. The Amritsar Bank was established in 1904 with a paid up capital of Rs. 30,000 which increased by 1912 to Rs. 1,76,000. The working capital of this bank is stated as just under Rs. 33 lakhs. The People's Bank of India has some eighty branches all over the country and only last March it is said to have declared and paid to its shareholders a dividend of 9 per cent. per annum. It has come as a great surprise upon people how, under the circumstances, within only the last half year, the Bank's affairs should have got into such hopelessness that liquidation should have been regarded as the only course open. The anxiety universally evinced to prop up the falling banks and keep them going is due not only to the perfectly laudable desire of saving the numerous depositors and shareholders from serious imminent loss but also to the solicitude for the health of the tender stripling of Swadeshi banking and Swadeshi industrial enterprise. There is no question that the failure of any considerable credit institution, especially under Indian management, means a decided set back to the industrial progress of the country and all endeavours to maintain public confidence in the concerns must be welcomed by all well-wishers of the land. It was well, therefore, that the shareholders and depositors of the People's Bank in the more important places in Northern India took steps not only to safeguard their immediate interests, but also to help the directors of the Bank to keep the institution going. At a meeting of the National Bank of Upper India, the Hon'ble Rai Ganga Pershad Varma counselled the depositors of the Lahore Bank to have patience and explained that Lala Harkison Lal had been the victim of personal spite and the jealousy of his rivals whose misrepresentations misled the depositors who rushed upon the bank for their money with the result that the bank's doors had to be closed. He said that the position of the Bank was sound and at a meeting of the shareholders and depositors of the People's Bank exhorted the latter to extend to the directors their sympathy and co-operation. The panic among the policy holders of the Bharat Insurance Company which is a concern of Lala Harkison Lal and is closely associated with the Bank, was allayed by the statement of the Directors of the Company that the total amount deposited in the People's and Amritsar Banks was only Rs. 80,000. Every movement in its younger days, such as joint stock banking in India, is exposed to dangers and the recent incidents in the Punjab ought to teach our people a wholesome lesson. It is calculated to awaken the public mind to the duties and responsibilities of shareholders, depositors, managers and others connected with banking and similar institutions.

During the last few years, there has been in India a remarkable outburst of industrial, commercial and financial undertakings, chiefly induced by the swadeshi movement and it has been found necessary to devise measures for regulating these activities in the interest of the public. The Insurance Act has been already passed and a new Companies Act will soon come into force. While agreeing that certain restrictions ought to be placed upon the organization and methods of public companies like banks for the purpose of ensuring the safety of investors and depositors and the healthy growth of indigenous industry and commerce, we would deprecate any legislation that may tend to check the natural development of credit institutions in the country. Restrictions would be welcome provided they are consistent with the normal growth of the economic and industrial movement. Commercialism ought not to be allowed to run wild; but care

should, at the same time, be taken not to place genuine enterprise at an avoidable disadvantage.

INDIAN JOINT STOCK BANKS.

At the present moment there is no special law relating to the incorporation of banks in India and therefore these concerns are registered under the ordinary Joint Stock Companies Act. In his book on *Indian Currency and Finance, very lately published, Mr. J. M. Keynes quotes some pertinent remarks of the Upper India Chamber of Commerce on this subject. The Committee of the Chamber in reply to an inquiry from Government in 1910 observed that something more was needed (than in the case of other companies.) in the case of banks where the capital and confidence, not only of the shareholders but of the depositors are involved. "New banks are springing up with alarming rapidity, with little share capital subscribed; these banks are trading on the confidence of the depositor who is little versed in money matters but is attracted by the name 'bank' and wishes to earn interest on his savings. The fear is that if one of these mushroom growths fails, others will follow, and the timid depositor, unable to discriminate between the sound and the unsound concerns, will make haste to get his money back from whatever bank it is in, and his confidence in banking institutions thus rudely checked, will take years to win back." Among the remedies proposed to cure the apprehended evil, regular audit and publicity of accounts, is, of course, the chief one. It has been suggested that no banking institution should be permitted to combine banking operations with other businesses, and that capital and reserves should bear a certain proportion to liabilities before dividends may be paid. The marked disproportion between the large amount of deposits and the meagre cash balances has, in fact, been pointed out as a serious flaw in the existing management of the Indian Joint Stock Banks. A great number of money lending establishments are registered as banks under the Indian Companies Act and much difficulty is experienced in obtaining a true idea of the position of Indian banking. But sixteen out of them having each a capital amounting to more than five lakhs are distinguished from the rest and the figures representing the capital, deposits and cash balances of these institutions are most instructive. A remarkably rapid activity in banking business began in the year 1906 when there were 10 banks with capital and reserve amounting to £1,270,000, deposits to £7,700,000 and cash balances to £1,000,000. In 1908 the corresponding figures were 14, capital, £2,060,000, deposits £10,840,000 and cash balances £1,630,000. In 1910 there were 16 banks which had a capital and reserve of £2,510,000, deposits amounting to £17,110,000 and cash balances to £1,870,000. In the last-named year the 16 banks with deposits of £17 millions had cash reserves of not quite 11 per cent. Of these reserves again, the greater part is probably held by the older and more established of the banks belonging to this class. The cash balances in the case of the smaller banks are regarded as hopelessly inadequate and Mr. Keynes says that in bad times they will go down like ninepins. According to him, the main object of most of these banks is, of course, to attract deposits by offering high rates of interest which are unreasonable. Joined to the speculative tendencies of many banks and the inadequacy of liquid reserves, these rates constitute a serious drawback in the banking system in this country. Mr. Webb in his new *book compares the proportions of the cash balances to the deposits of the three classes of banks, the Indian Joint Stock, Exchange and Presidency Banks and gives the ollowing figures :—

The Indian Banks hold about 11 per cent. of their deposits in cash.

The Exchange Banks hold about 18 per cent. of their deposits in cash.

The Presidency Banks hold about 30 per cent. of their deposits in cash.

He observes that though the proportion of cash balances to deposits is not the only or even the chief gauge by which to measure the soundness of any given banking institution, it is nevertheless a very important indication of the way in which a bank's management is conducting its business and of one of the risks that the bank is regularly running. In his opinion, the percentages given above reveal a weak spot in the methods of the Indian banks to which Indian bankers and Indian depositors would do well to give immediate attention. In view of the calamity which has overtaken the banks in the Punjab and the points of weakness in Indian banking institutions which have now been laid bare, we feel it is necessary that the whole question should be fully threshed out and the real situation brought to light.

* Indian Currency and Finance, by J. M. Keynes, *Messrs. MacMillan & Co., Ltd., London, 6/ net.*

* Advance, India, by M. De. P. Webb, C.I.E., *Messrs. P. S. King & Son, London, 5/ net.*

The Agricultural World.

Manuring Sugar-Cane.

BULLETIN No. 66 of the Department of Agriculture, Madras, is a note on the manuring of sugar-cane at the Samalkota agricultural station in the Godavari district during 1902-1912.

Taking the work over the whole period into consideration, the main conclusions arrived at are :—

(1) That, on this delta land, for the manuring of sugar-cane artificial manures are not to be recommended.

(2) That, with the price of castor-cake at about four times the price of margosa and pungum cake, the latter is a more economical manure than the former.

"Margosa" is a local name name for the Nim tree (*Elia azadirachta*) and pungam is a tree or climber (*Pongamia glabra*) whose seeds yield an oil used for illuminating and for medical purposes.

Cattle-manure has given uniformly poor results. It is however doubtful whether this has not been due to some extent to the method of application, rather than to any inherent fault of the manure itself which was good box manure carefully prepared. This point will have to be tested before a definite statement can be made regarding the value of this manure as compared with other manures.

The Relation of Lime to Magnesia in Soils.

The following are the general conclusions of pot-culture experiments begun in 1906 on wheat by Dr. J. A. Voelcker :—

1. Magnesia may, with advantage to the wheat plant, be added to a soil poor in magnesia, so long as the amount of magnesia in the soil does not exceed that of lime.

2. As the ratio of lime to magnesia approaches 1: 1, a benefit will continue to accrue, but if magnesia be in excess, a toxic influence will be exercised and the crop diminished.

3. Soils in which magnesia is in excess of lime will not give fully satisfactory results as regards corn-growing, but will be benefited by the addition of lime.

4. Lime used in excess does not possess the toxic influence which magnesia similarly used has.

5. Magnesia and lime alike are capable of modifying the growth of the wheat plant, altering the nature and extent of the root development and the character of the grain. These modifications are mainly shown in the stronger and greener appearance of the flag, the production of a much developed and very fibrous root growth, and the greater assimilation of nitrogen, resulting in the obtaining of a more glutinous grain.

Effect of Radium on Plants.

The scientist H. Molisch finds that radium rays have the effect of interrupting the repose of winter buds of different woody plants and thus give rise to a precocious budding. The time of exposure to the radium should be determined very exactly, and should this be too short there is no action produced; while a long exposure is injurious and even mortal. Radium effects are not felt either at the beginning or the end of the repose period. The emanation from radium is also used, and it acts even better than rays from radium salts, as the effect is more diffused and uniform. Although the radium salts are too expensive to be used in practice for this purpose, the results are of interest, especially as strong rays from radium do not appear to have the same action upon plants in full growth as they have during the repose period.

Cereal Seed Selection in France.

We gather the following from an article on the above subject by Mr. Blaringhem who writes to the *Monthly Bulletin of Agricultural Intelligence and Plant Diseases.*

For a long time farmers were employed in experimenting on the production of the best cereals. But now owing to the risk and speculation which the method entails, they have given up the purely scientific side of breeding the best cereals, which has been undertaken by public botanical institutions.

After summarizing the results of the investigations the writer concludes, "the method of the preparation and diffusion of the varieties of the pedigree cereals devised at Svalof, and practised in Sweden and in France, allows the most important problems of modern agriculture to be solved. The increase of yield, the greater value of the product guaranteed to the industries that use it, the security of purchases and sales, the production against diseases, are the principal, though not the only, advantages that French agriculture will reap from the use of pedigree seeds, controlled at each generation.

U. S. A. Agriculture Publications.

The Secretary of Agriculture has announced a new plan of publication work for his department. The old independent series of bulletins and circulars of the thirteen publishing bureaus, divisions and offices of the department have been discontinued and will be superseded by a new *Journal of Research* for printing scientific and technical matter, and by a departmental series of bulletins, written in popular language for selected and general distribution. By this plan, the confusion that has resulted from the multiplicity of series of publications will be avoided, and the saving of a considerable sum will annually be effected. Under the new plan the department will discontinue the general distribution of matter so scientific or technical as to be of little or no use to the lay reader. It will supply technical information only to those directly interested and capable of using scientific analyses, and of understanding the results of research work couched in scientific terms. A larger amount of information in popular form which the average reader can immediately apply to his own direct advantage, and thereby increase the agricultural productiveness and the health of the nation, will hereafter be distributed.

The Value of Soil Analysis to the Farmer.

Mr. A. D. Hall thus summarises the present position of soil analysis in *The Journal of the Royal Agricultural Society of England.*

1. Mechanical analysis enables us to classify soils and assign an unknown example to its type.

2. From the type, combined with knowledge of the situation and climate, we may predict its suitability or otherwise for particular crops.

3. Chemical analysis will tell us whether a soil is getting acid or needs liming to make it work properly and utilize the manure supplied to it.

4. From chemical analysis we can settle what class of manures ought to be used—whether sulphate of ammonia or nitrate of soda, superphosphate or basic slag.

5. Chemical analysis will often reveal particular deficiencies and the specific need for phosphates or potash, but to do this with any certainty, the composition and behaviour of soils of that type should be known from a previous soil survey.

The writer draws attention to the fact that abnormal soils have frequently to be dealt with, and in order to attack the problems presented by such soils it is necessary in the first place to accumulate information and data as to the nature and composition of known soils, and in the second place to increase our knowledge and perfect our methods of analysis.

Pine Apple Cultivation in Ceylon.

We are indebted to Messrs. Freudenberg and Co., Colombo, for an excellent booklet on pine apple cultivation in Ceylon.

It has been written with the object of encouraging the growing of pine apples, firstly, for meeting the local demand, and secondly, for purposes of export either in the fresh or preserved condition.

It may be here mentioned that there is a good demand for pine apples in Upper India, and that fruit of good quality is likely to fetch excellent prices. Such pine apples as reach the Calcutta market come from the South-West Coast, so that it ought to be possible to transport fruit in good condition to Calcutta and establish a thriving business there.

We commend the directions given in this little work to all those who are growing, or are thinking of growing, pine apples as we are sure they will profit thereby; for it is mere waste of time and money to imperfectly cultivate such a crop. With proper attention

to selection of land, tillage, and particularly, manuring, there is no risk in the enterprise; on the other hand, there is very good prospect of making money.

A Plea for an Improved Plough.

Mr. R. Palit, late Editor of the "*Indian Economist*" contributes an article on the above subject to the July number of the "*Indian Review.*"

There are few countries where the natural advantages of growing crops at a cheap rate are greater than in India. And yet crops are not grown here at a rate cheaper than in other countries. The problem therefore is how to obtain the largest yield from the soil with the least possible expenditure.

The first and chief want of the ryot in India is a better and more efficient plough. The objects of a plough are to stir and loosen the soil and to invert it; but the Indian plough is almost incapable of inverting the soil and in simply stirring, it is very far from being economical. Hence ploughing in this country is generally very inferior to that done in Europe.

With the modern improved plough the work is very different; it does not make grooves like the primitive plough in this country, but cuts and turns up the furrows of required sizes, leaving the ground underneath perfectly flat. These ploughs can cut furrows from 16 to 14 inches wide and from 4 to 14 inches deep. And the wider the furrows, the less the distance to be travelled by the cattle to plough a given area of land.

It will be seen how wastefully the operation of ploughing is carried on in this country when it is said that the average width of the indentation or groove made by the country-plough is about 3 to 4 inches, and the same cattle with an improved plough can cut and turn a furrow six inches wide by five inches deep. When the Government places before the ryot a cheap and durable plough, the abuse attaching to agricultural operations in this country will become, says Mr, Palit, a thing of the past.

A Heifer's Milking Period.

Mr. James Long advises in the *Farm and Home* that no cow should be milked right up to calving, still less a heifer; there should always be a good rest of six to eight weeks, but in the case of the heifer, this period should be extended. It should be remembered that a heifer is not mature and that in many instances she is growing while she is carrying her calf. It is for this reason that we believe heifers should not be served for their first calf so early as is common to-day. Instead of milking right up to calving—a practice which would be most detrimental to the animal—it should be quite the other way; the intermediate period between drying and calving should be extended and not reduced. The drying period may therefore be advisedly fixed at three months. The result will be that the effort to produce milk is concentrated upon the system of the heifer and her calf, both of which will derive advantage from the cessation of milking. It is owing to thoughtlessness in the management of a heifer that so many young beasts make such very poor cows. For the same reason, it is advantageous to postpone the service of a heifer by a couple of months after she had dropped her first calf. This, too, will assist her in maturing, making larger size, and milking better with her second calf. There is no risk of irregularity by the adoption of this plan. A little sacrifice with a heifer in the early first stage of her life will be more than made up by her afterwards.

Superiority of Tin Cans over Pots for Seedling Plants.

An ingenious investigation into the circumstance observed in Hawaii, that seedling plants like mango and avocado, grow better in tin cans than in earthernware pots, is described by Mr.E. V. Wilcox in Press *Bulletin No. 41 of the Honolulu Experiment Station.*

For the practical propagator the results of the investigation are of very considerable importance, and of a character highly suggestive.

As a working basis, it was supposed that the two factors involved were differences in evaporation, and stimulation due to tin and solder in the cans. In the course of the experi-

ments it was found that the average evaporation from pots was exactly two and-a-half times greater than that from the tin cans, though, as might be expected, in sunshine, the relative increase was greater for the tins owing to the more rapid penetration of heat The soil in a pot was found to be more exposed to evaporation than even the greater surface area would indicate. A more interesting result was the discovery that with the ordinary pot, 52·3 per cent. of the evaporation takes place through the top, and 47·7 per cent. through the side. Further determinations showed that the evaporation from a given area is 3·5 times as fast through a free surface of soil, as through the side of the pot.

A continuation of the investigation consisted in the growing of seedling plants in pots of varying porosity, and the height and vigour of the plants increased in regular gradations as the porosity diminished. It was next found desirable to determine the loss of water by transpiration.

This was done by the remarkably simple method of subtracting the loss in the tins and pots without plants from the loss from the tins and pots with plants.

The results showed that the total loss from two months-old plants in pots was approximately the same as that from two months old plants in tins, the explanation being, of course, that the greater loss by transpiration from the larger and more vigorous plants in the tins, balanced the greater loss by evaporation from the soil in the pots. Leaf measurement showed that transpiration was 1·6 times greater in the case of the plants in tins, and therefore they might obviously be considered as growing more vigorously.

The great advantage of using tin cans rather than porous pots seems to rest in the fact that in tins it is easier to maintain a nearly constant moisture content without a rapid drying of the soil about the growing roots which naturally follow the horizontal water movement towards the side of the pot.

Finally, in regard to the influence of the presence of salts of tin and zinc, plants grown in untreated cans did better than those grown in cans of which the internal surfaces had been waxed. This result together with the fact established, chemically, that very dilute solutions of tin and zinc salts do have a stimulating influence on plant growth, would appear to be good evidence in support of the conjecture that the presence of these salts in the tin can, is a second beneficial factor which is absent in the case of its rival the earthernware pot.

The Insect Pests Bill.

Grant Duff who was Governor of Madras some years ago once remarked that the ryots in South India were liable to the danger of starvation should it ever happen that the only extensive crop which they cultivate, namely, rice, is devastated by some diseases. So far the danger has not yet occurred, but who knows that the lot that fell to the potato crop of Ireland may not happen to the rice crop in India. Plant pests are not yet a common feature in the holdings of the ordinary agriculturist in India, but diseases in special plants like coffee are of common occurrence and are being heroically combated by the European planters. In an agricultural country like India, it is essential that crops should be saved from all avoidable diseases and to this end, it is necessary that all imports of agricultural seeds, bulbs and cattle should be closely watched. It is in this view that an Insect Pests Bill has been recently introduced in the Imperial Legislative Council.

In introducing the Bill, Sir Edward Maclagan said—The Government was addressed some years ago by the Bombay Chamber of Commerce who pointed out that most other countries had protected themselves by somewhat stringent measures from the damage done to agriculture and gardening by the introduction of destructive insects and other pests. They urged upon us that, with the increase of communications, the time had then come when similar precautions should be taken in India. On receipt of this representation we consulted our experts and ascertained that in several cases the disease had already been introduced, along with

imported material, and that there were many destructive diseases in other countries which were likely to be introduced into India if no restrictions were imposed. We further ascertained from the Customs authorities that a considerable number of packages containing fruit, bulbs, roots, seeds, and plants were regularly imported into India and it seemed clear that, if steps were not taken to control such importations, considerable loss might be occasioned to the agriculture and fruit culture of this country. Our next step was to consult the various Local Governments and through them to obtain the opinions of the several Chambers of Commerce, the Superintendents of Botanical Gardens and other Botanical experts, the fruit-growers, the tea and coffee growers, and the Planters Associations and these opinions, upon receipt, were placed before a committee of experts who then submitted definite proposals for dealing with the question. We had originally proposed to impose the necessary restrictions by a notification under the Sea Customs Act of 1878, but we found that the terms of that act did not adequately cover the case with which we had to deal. We decided, therefore, to resort to special legislation and the present Bill has been, accordingly, prepared, under which the Government is armed with the powers necessary for the purpose. After preparing this Bill we ascertained that a Conference was to meet in Rome in April 1913 to discuss this very subject. We, thereupon, nominated one of our officers to attend the Conference and took no further action with regard to the Bill, pending the receipt of the recommendations of the Conference. But as the Conference was afterwards indefinitely postponed it was decided to proceed with the Bill as it stood. The provisions of the Bill are based, partly on the corresponding English Acts of 1878 and 1908 and partly on the Indian Livestock Inspection Act of 1898. They give the Government power to regulate or, when necessary, prohibit the import of specified articles which cannot be unreservedly introduced into the country without entailing a likelihood of danger to crops and gardens. This power, I need hardly say, will be used with discretion and applied only where their exclusion is considered to be really necessary. In some cases we should probably require a certificate from the country of exportation that certain diseases, are not prevalent in that country or in the neighbourhood where the crop was grown as the case may be, and in others we shall need a license by the Agricultural Department in this country which would be given on satisfactory evidence as to the reliable character of the merchants from whom the stock was received. In another class of cases, it will be necessary to go further, importation being confined to certain ports and arrangements being made for subjecting the suspected articles to fumigation. Our object is to deal with the more injurious kind of imports only, but to deal with them effectually so as to save the Indian agriculture and industries, as far as possible, from the more serious causes of loss to which they are exposed from the present system of unrestricted importation. With this explanation, My Lord, I move for leave to introduce a Bill to prevent the introduction into British India of any insect, fungus or other pest which is destructive to crops.

The Organisation of Seed Farms in the Central Provinces.

Mr. G. Evans, M.A., Deputy Director of Agriculture, Central Provinces, contributes an article on the above subject to the July number of the *Agricultural Journal of India*.

The Central Provinces Agricultural Department has for several years past paid particular attention to improving the types of seed in common use among the cultivators. The staple seed supply of the Provinces affords scope for an immediate improvement, simple to demonstrate and easy to perceive, the practical adoption of which presents no serious difficulty to the average farmer. The present supply is of inferior quality and contains an admixture of more than one variety. The article describes the various types of seed farms at present in existence in the Central Provinces.

In the first place, the isolation of pure high class varieties is undertaken on the Government farms. The next step is to advertise the seed by means of demonstration plots, exhibitions, and agricultural meetings It is then tried on a field scale under varying local conditions. The out-turn is compared with that of the common local variety, and, when results are favourable, a local demand for pure seed soon springs up.

The co-operation of the farmers is necessary because the Government Agricultural Stations are far too limited in area and hence in every district an Agricultural Association has been formed, consisting of the leading landowners. This year 42 seed farms for selected kinds of wheat were under the supervision of the Department in the Northern wheat tract.

These seed farms are arranged in groups within easy distance of a good grain market so that the surplus produce, as soon as the demand for seed in the neighbourhood has been satisfied, may realise a full price, and thus further emphasize the advantage of growing pure varieties. Definite rules of management are prescribed. The growth of two varieties is prohibited ; and the necessity for a separate threshing floor for the new crop, separate storage of the produce, and regular inspection by the itinerant Agricultural Assistant in charge of the circle, is emphasized. The area to be sown in the case of wheat must not be less than 25 acres in the first instance.

But, says Mr. Evans, these Agricultural Unions controlling the seed farms cannot be expected to reach their fullest development until they are brought into close connexion with a number of Co-operative Credit Societies. In the Central Provinces, after much discussion and many initial mistakes, the following system has been finally evolved. Agricultural Unions composed of Co-operative Societies, and no of individual members, have been formed Each Co-operative Society appoints one of its members to act as Kamdar or Manager ; and he is responsible that the individual members carry out the rules intended to ensure that the new varieties are kept pure. Once or twice a year, the Union Committee meets in the central village. It is composed of the Kamdars of the various Societies which are incorporated in the Union. The President is a leading Malguzar who has a large seed farm on which fresh seed from the Government Farm is grown each year. The President, besides being a member of the District Agricultural Association, is also a Director of the Co-operative Central Bank at Sehora. At these meetings of the Union Committee each Kamdar reports what his Society requires for the following season and how much surplus stock is available for sale. In order to purchase the seed they require, individual members borrow money on the usual terms from the Central Bank. The Kamdar receives a small annual remuneration from the other members of the society in return for the services he renders.

Incorporated with the Agricultural Unions is a Central seed store which registers orders for seed and arranges the supply from the incorporated seed farms. The seed is graded by a specially trained man, and no seed not up to standard is thus sold for seed from the seed farms.

Three Agricultural Unions have been organised. One accepted principle is that, wherever Co-operative Societies exist, the Agricultural organisation must be worked through them, to the mutual advantage both of the societies and of the system of control, whatever it may be, under which the seed farms may be placed.

The Action of Grass on Trees.

Professor S. Pickering writing in *Science Progress* points out that the harmful influence of grass on fruit trees varies considerably with the nature of the soil and the method of treatment. Young trees planted in land already grassed or put down to grass immediately after planting suffer most, while if grass is merely allowed to establish itself slowly in an older plantation, the effect seems to be reduced to a minimum. But the action is a perfectly general one, and with one single exception has been observed in all parts of England and in

all classes of soil. The visible effect is not confined to stunted development, but is manifest too in the altered colour of bark, leaves and fruit.

From a summary of the article appearing in a recent issue of the *Monthly Bulletin* of the International Institute of Agriculture, Rome, we gather that numerous possible causes of these changes have been investigated, foremost among which are lack of water and plant food owing to the competition of the grass. Trees under grass were watered by means of tubes so that the soil in contact with their roots was more moist than the adjacent tilled soil, and observations taken one season showed that the moisture content in soil under grass was never reduced below the optimum point, yet in both cases the trees were obviously less healthy than similar trees in tilled soil. In other experiments carried out in pots, the grass roots were prevented from coming in contact with the tree roots by a sheet of fine gauze placed about 4 inches below the surface, and plant food was supplied from below, yet even under these conditions the trees suffered from the grassing. Added to this, the general conclusions that trees in tilled soil do better in dry years than trees in grassed soil in wet ones, also that soil under grass is usually richer than tilled soil, dispose of the water and food supply as possible causes. Feeding the grass with sheep does not improve matters, and the effect of keeping poultry in grass orchards is now being investigated. Mechanical analyses of the soils failed to reveal any contributing cause, nor was the effect stimulated when the soil was made alkaline. Lack of aeration would not appear to be of importance from a consideration of the fact that trees were grown in a soil artificially enriched with carbon dioxide without disturbance, and it is equally impossible to make differences in temperature between grassed and tilled soils account for the phenomenon. Finally, bearing in mind all the available evidence, the writer was led to the conclusion that the action must be due to some *toxic effect*, using the term in its wider sense to mean the presence of some poisonous substance in the soil, without defining its direct source; this hypothesis is certainly confirmed by the following experiment:—trees were planted in pots, the surface of which was covered by moveable perforated trays on which the grass was grown. In spite of the complete separation of the grass from the tree roots, the growth was reduced by 25 per cent.; when, however, the drainage from the grass was collected and left exposed to the air some time previously to being used on the tree, the effect was beneficial. These results indicate that the trees suffer by reason of something added to rather than removed from the soil, also that by oxidation the toxin is converted into plant food.

Now when a soil is heated, the amount of soluble organic matter it contains is increased, and at the same time the soil becomes toxic to germinating seed. Both these effects are considerable at 150° C., but diminish with the temperature; they are still recognisable at 60° C. and probably begin to operate at 30° C. A similar effect is obtained when a soil is treated with antiseptics, and the toxic substance decomposes gradually if the soil is ærated and moistened, but remains unaltered for several months if air is excluded from the soil; the rapidity with which the toxin is formed indicates that it is a direct and unstable product of chemical reaction. The soluble organic matter also decreases with time, but not as rapidly as the toxin, so that when the latter has completely disappeared some excess of the soluble organic matter is left over and accounts for the increased fertility of the treated soils. Tomato and tobacco plants grown in soil heated to 30°, 60°, 80°, 100°, 125°, and 150° C. respectively, clearly showed the effect of these two opposing factors; after a preliminary check, the plants grown in the soils heated to the lower temperatures recovered and were able to profit by the increased nitrogen supply, but when the soil had been heated beyond a certain point, the check was too prolonged and the plants never caught up lost time, so that it required a second crop to show the effect of the increased nitrogen supply. The results varied a little according to the sensi-

tiveness of the plants, but on the whole the results justify the conclusion that the oxidisable substance which is toxic to seeds is also toxic to plant growth. In order to extend the experiments to trees, the æration of the soils was restricted by enclosing them in bottles, and under these conditions the toxic effect of those heated to 125° and 150° C. became noticeable.

Coming back to the question of grassing, a somewhat analogous case is presented when soil is first uncovered by the removal of grass; it does not behave normally at once, but after exposure to the air becomes more favourable to plant growth than ungrassed soil, owing to the presence of a larger amount of nitrogenous and organic matter. The resemblance between the behaviour of grassed and heated soils is shown in yet another manner: owing to the presence of some oily or waxy substance, heated soils are more difficult to wet than unheated soils, and this peculiarity is reproduced to a lesser degree in grassed soils. On the other hand grassed soils have never proved toxic to germinating seeds, so that the connection between the two cases is not established, though they undoubtedly have some points in common.

The writer is unable to accept Russell and Hutchinson's hypothesis of protozoa as the limiting factor in soil fertility, for on this hypothesis a maximum fertility should be obtained by heating soils to 50° C., at which temperature protozoa are killed with least injury to bacteria. He points out that his experiments do not confirm this view; but, he adds, on the other hand, if the process is a purely chemical one resulting in the formation of a toxin it seems difficult to believe that the plant food liberated by heating a soil to 100° C. would be sufficient to account for the extra vigour of plants. He concludes by saying that "both explanations are probably correct but neither alone affords a full explanation of the facts."

The Importance of Stock Raising.

The Poona Agricultural Conference was held at Poona on the 15th September and was presided over by H. E. Lord Willingdon, Governor of Bombay. His Excellency in the course of his speech said that he had noticed that much had been said and written about improvements in horticulture and improvements in machinery, but little or nothing as to stock-raising Most people went in for stock-raising. for purposes of agricultural operation only, while none thought of improving the breed of animals. What all must endeavour to do was to improve the dairy cattle of the country. He believed that the prejudices would disappear when the people came to realise that such measures were for the betterment of agriculture and of the people generally. He considered that the Government ought to do something in this direction. They had a certain number of dairy farms in this country, and he considered that they ought to introduce a good breed of stud bulls to improve the breed of cattle.

Continuing, His Excellency said that he had started a practical experiment at Ganeshkhind. He was going to breed the highest class of Sindhi cattle. He was going to start a Home Farm at Ganeshkhind to set an example to other people, and he hoped that his example would be followed by all great people of the country, Rajahs, Sirdars and the landowners. By this means they would be able to supply good milk and butter to the people. This Home Farm would help to create a bond of sympathy between himself and the people. It would help him and others to a knowledge of the difficulties of the tenant farmer, and would thus bring the people into closer touch with one another. He thus hoped to see Agricultural Shows springing up all over the country, at which he expected to see all classes competing for prizes.

Motor Ploughs.

Motor ploughs are being used in Siam, their employment having already passed the experimental stage. The motors in use are oil-driven traction engines of a somewhat antiquated type, which have been adapted for ploughing by various ingenious devices. They work well and give little trouble. The best motors are of 15 h. p. and are used to pull heavy disc harrows, ploughing about 2½ acres per day of hard clay to a depth of four inches. Another adaptation is of a 5 h. p. motor to pull a two-furrow share plough. The cost of ploughing small fields by motor is found to be much cheaper than ploughing in the old-fashioned way with buffaloes or bullocks, and the cost might, it is stated, be still further reduced by using motors which are specially made for ploughing purposes.

The Co-operative World.

Women in Co-operation.

WE learn from the *Leader*, that at a recent meeting of co-operative societies held at Fatehpur, eight women-members of the societies were present and followed the proceedings intelligently;—the first instance of its kind, at any rate, in the United Provinces. This is a distinctly hopeful sign of the times. Another important and admirable example that Fatehpur has set is the introduction of free and compulsory primary education among the children of members of co operative societies. Attendance is compulsory for two hours every day in the case of both sexes. No opposition has been aroused thereby and advantage is being taken by the ignorant of the facility thus offered. The credit for this excellent work is due principally to Fatehpur's premier citizen, Rai Iswar Sahai Bahadur.

A Concession to Co-operation in Mysore.

The Registrar of Co-operative Societies, Mysore, represented that, to require a Society to pay a fee of one rupee on every application made by it for registering its name in the Special Notice Register, will have the effect of compelling the Society either to incur a heavy expenditure on its loan transactions or to take the risk of finding its security less valuable than it anticipated, by neglect of this precaution. The Government of Mysore are of opinion that Co-operative Societies being in an infant stage require help and support and have accordingly exempted them from the payment of the prescribed fee for getting their names registered in the Special Notice Register. The Government are also of opinion that, with a view to eliminate from the register from time to time the names of persons who are dead or have lost their interest in the lands concerned, it is necessary to make the entries in the register renewable periodically. They have, therefore, directed that the entries in the Special Notice Register should be renewed every five years, no additional fee being, however, charged on applications for renewal.

The Co-operative Movement in India.

From a statement made at the last meeting of the Supreme Legislative Council in reply to a question asked by the Hon. Mr. Ghuznavi, it appears that the Co-operative movement has made marked progress in recent years. The statement runs as follows :—

The popularity of the co-operative movement in India is already, as the Hon'ble member is aware, of a very marked character since 1906. The number of the societies has increased from 843 to 8,177, the number of members from 91,000 to 4,03,000 and the amount of capital at the disposal of societies from 23½ lakhs to 333 lakhs. For the control and guidance of this rapidly growing organisation and the supervision of further extensions, whole time Registrars have been appointed in all the major Provinces and the Local Governments have authority to entertain any subordinate staff that is necessary. Large provincial co-operative banks have already been established in several provinces and any proposals for the development of the system in other areas would receive careful attention from the Local Governments concerned.

The Hadapsar Co-operative Society.

One of the remarkable features of the Hadapsar Co-operative Credit Society in the Bombay Presidency is that its membership includes all sections of the village community, viz., Brahmans, Malis, Marathas, tailors, washermen, Banias, Muhammadans, Christians, members of the depressed classes and of the very lowest

out-castes. One of the features of the annual meeting held recently was the speeches by various individuals, including a Mahar and a Mang, who briefly stated what the Society had done for them. Besides helping its members with money, the Hadapsar Co-operative Credit Society does a good deal of work in the direction of agricultural improvement, and arranges for lectures to be given to its members and to the general body of the ryots. Among the members are 17 women of the agricultural class, who have deposited Rs. 3,000. Other women in the village, mostly labourers, have deposited Rs. 1,650. Outside ladies have deposited Rs. 2,100, among these being Mrs. Ramabai Ranade, the President of the Poona Branch of the Seva Sadan.

The Work of an Agricultural Union.

At the Central Provinces Co-operative Conference held the other day at Jubbulpore, Rai Sahib Gurdin Misra explained the working of the Agricultural Unions for the production of improved varieties of wheat in the Sihora Tahsil. These Unions consist of co-operative credit societies banded together conducting their cultivation on systematic lines. The Unions employ and pay their own Kamdars. Once or twice a year, the Union Committee meet in the central village, this committee being composed of the Kamdars of the various societies which are incorporated in the Union. The Kamdar is always appointed from amongst the members of co-operative societies of the Union. The President of the Union is a leading Malguzar with a large seed farm on which fresh seed from the Government farm is grown every year. The President, besides being a member of the District Agricultural Association, is also a Director of the Sihora Central Bank. At Committee meetings, Kamdars report the seed requirements for the following season and also state how much surplus produce would be available for sale by the Unions. In order to purchase the seed they require, individual members borrow money, on the usual terms, rom the central bank. Kamdars would eventually be supervised, he said, by the Manager of the Evans Seed Supply Association but at present, this duty is being performed by an Agricultural Assistant until such time as the Seed Association would be able to employ adequately trained staff. His own Union, said the Rai Sahib, had ordered this year for its own use 57,000 lbs. of wheat seed and 7,000 lbs. of grams. The area under pure varieties controlled by his Union this season would be 1,600 acres.

Co-operation for Small Holders.

The members of the Departmental Committee that recently enquired into and reported upon the provision of buildings for small holdings, in the course of a letter to the Press making suggestions for expediting the development of the small holding movement urge the necessity for co-operative action. Not only is it necessary, they point out, that they should combine to purchase their requirements in order that they may acquire commodities as cheap and good as possible, but it is even more essential that they should unite to dispose of their produce in bulk, and thus obtain the benefits of systematic grading, packing, and sale, of better transport facilities, and of business-like distribution in suitable and not glutted markets. Although the Act of 1908 recognizes the importance of co-operation and credit, practically nothing has yet been done to develop either, and the recent efforts of the Board of Agriculture to create a system of rural credit are by no means certain of success. To obtain the fullest benefit of these and other advantages the development of small holdings on the colony system offers by far the greatest opportunities. Thus, land can be acquired more cheaply and equipped more economically in bulk; the necessary basis as to numbers of holders and similar cultivation of their holdings is thus supplied for co-operation as *e.g*, in purchase, transport, sale, and the common use of more expensive implements and a suitable field is at once provided for taking advantage of the provision of breeding stock under the Board of Agri-

culture's new live stock scheme. And, finally, the expenses of supervision and management and the objections of the large farmers would be mitigated by a method which takes up whole farms instead of abstracting from existing tenancies. This latter process, by the way, often constitutes a real hardship. For, although theoretically compensation is given, such compensation cannot really make up for the upsetting of the scheme of farming operations; particularly is this the case with farms of under 500 acres.—*Hindu.*

Central Banks and Popular Education.

Among the most interesting papers read at the recent Jubbulpore Co-operative Conference was one on "Central Banks and Popular Education," by Mr. Crosthwaite, the Registrar of Co-operative Societies in the Central Provinces.

Mr. Crosthwaite pointed out that education must stand in the very forefront of the programme of Co-operative Banks. It was the business of the Central Banks to advance by all means in their power the moral and material prosperity of the credit societies which were their clients; therefore Central Banks should work in close co-operation with the experts of the Agricultural and Industrial Departments; for co-operative societies provided, as nothing else could, a suitable means of introducing improved methods both in agricultural and cottage industries to petty cultivators and artisans.

The Registrar said that the co-operative policy in the Central Provinces ought to be, and would be, as generous and comprehensive as possible. The mere lending of money was not the true aim of co-operative banks; but money was an indispensable necessity and it was the business of educated co-operators to teach ignorant people how to use it to the best advantage. He, therefore, put the following four resolutions before the Conference:—

"(i) The progress of our co-operative banks (which include amongst their members and their directors the best educated men available) must not be confined to lending money only but must extend to the spread of general enlightenment amongst the societies which are members of and are financed by the banks.

"(ii) In order to keep the active support of our educated workers, we must captivate their imagination and show them clearly that co-operative banks are not intended only for the benefit of certain classes but that they fit into a scheme of general improvement.

"(iii) Government must give the necessary assistance in carrying out this scheme but must not itself undertake too much or too little. Both ways lies danger. Safety can only be secured by correct adjustment.

"(iv) We must be careful not to emulate too hastily certain advanced forms of co-operation in other countries. It is far better to await the results of education in co-operation than to force the pace and make a mock of self-help by running societies with an excessive measure of Government assistance. If a project be such that there cannot be a fair division of work between officials and unofficials, then clearly it is too advanced and should be postponed until unofficial co-operators are fit to perform their proper share of the task."

The above resolutions were accepted unanimously by the Conference.

Benefits of Co-operation.

Mr. S. H. Freemantle, speaking some time ago before a meeting of the East Indian Association, thus summarised some of the economic results which in Continental Europe have followed the introduction of the co-operative movement in agriculture:—

"Germany for instance has in its agricultural Districts some 24,000 societies, one for every 2,543 inhabitants. In that country and in parts of France, and Northern Germany, rural economy is completely organised on co-operative lines. What this means is that the peasantry combine for all purposes connected with agriculture, *viz.*, for the provision of credit, for the supply of fodder, seeds, manure and other agricultural necessaries, for the joint ownership of machinery, for the sale of produce and livestock, for the working up of their raw material in sugar beet factories,

distilleries, bacon-curing establishments, &c., for the mutual insurance of cattle from accident and disease and of crops from hail, for the improvement of land by drainage and irrigation, for the maintenance of stallions, bulls and rams for breeding purposes and for the supply of water and even electricity and telephones. There are also cow-testing societies which employ men to go round the farms and record the milk given by individual cows and others known as control societies whose employes keep the farmer's records of money returns from each kind of crop and advise as to rotation and seeds."

Besides these benefits of the co-operative method as adapted to agriculture, excellent moral results have also followed the combination of the peasantry in these matters. Thus we are told that these Societies support many kinds of social institutions such as village halls and libraries, village nurses and sick and provident funds. It would appear that, from funds provided by these institutions, 458 libraries, 237 continuation schools, 96 evening clubs, 23 juvenile clubs, and 24 meeting halls in villages have been established. There have been started, besides, 108 infant schools and 181 children's savings banks, while many benefit funds, cattle insurance schemes, accident and sick funds, &c., have also been started.

In Sir Henry Plunket's words, co-operation means for the peasant, better farming, better business, better living ; better farming because more capital will be applied to the land, better seeds, manures, implements and livestock will be obtained and expert advice would be available ; better business, because the small man by combining with others gains all the advantages of a wholesale dealer; better living because economic prosperity and combination for business purposes bring in their train a well ordered social and intellectual life. The people learn to think for themselves. Education and sanitation are encouraged and a stimulus is given to the reform of social customs. The society induces the growth of a corporate life and the mere fact that in any village, a committee exists representative of all classes of the agricultural community is of great potential value to any Government and to any country.

The Finance Commission and Co-operation.

One of the witnesses before the Royal Commission on Indian Finance is Sir Daniel Hamilton of Calcutta and his evidence evinces a sympathy with the ryot which should gladden the heart of every worker on his behalf in India. Dealing with the question of the State Bank, Sir Daniel emphasizes the fact that the great defect hitherto in India has been the impossibility of the agriculturist getting access to ready and cheap finance, he being entirely left to the mercy of the small money-lending capitalist. He refers to the agriculturist as the most important man in the country, upon whom all India depends, the man without whom neither the trader, nor the Banker, nor Government could exist, and who is withal left outside the reach of cheap money. One has only to take up the export list of India to see how true this is, for it is the man on the land who is the mainspring and source of the vast majority of the items which go to make up India's exports and consequently India's wealth. While giving to the Government all the praise due to them for their great efforts to improve the agriculture of the country, Sir Daniel lays stress on the fact that their efforts will be largely in vain unless the people themselves are to get the increase, resulting from their labour, which can only follow on improved finance, accompanying improved agriculture, the organisation of capital being really of more importance than the increase. Admitting the State Bank as a necessity, its work should be to shift the control of capital from the hands of the non-producers to those of the producers of the country's wealth ; but unless it can do this more effectually than present existing institutions, its creation is not called for, there being already sufficient facilities for ordinary financial requirements. The link between such a bank and the agricultural industry is of course the co-operative credit movement, and

the impetus given to production by the provision of cheap finance, Sir Daniel holds, would be so great in its effect on the export and import trades that the exchange Banks would accord to what would be in no sense a rival institution a very hearty welcome, and even take a capital interest therein.

All the points under investigation by the Commission are ably dealt with, but whether it be the cash balances in London, the Treasury balances, the gold standard, paper currency reserves, the sale of Council Bills or the gold currency, the moral reduced from all suggestions is the extension and perfection of the co-operative credit methods, which are languishing both for want of men and for want of money. Whether or no the Commission regard the evidence of Sir Daniel as outside the scope of their powers, he has, as observed by the Calcutta correspondent of the *Pioneer*, provided food for much serious thought for those responsible for the well-being of the people of India, as distinct from the small minority who, having the loudest voices and the longest purses, are always the first to be considered in any changes whether financial, social, or political.

The Co-operative Ideal.

The ninth Congress of the International Co-operative Alliance was opened on the 25th August in Glasgow. There were 600 delegates representing over 20,000,000 members of 130,000 societies in the 24 nations incorporated in the Alliance. Mr. William Maxwell, the President occupied the Chair, and those present included Lord Grey, the Honorary President of the Alliance. The proceedings were conducted in three languages—English, French and German.

Lord Grey, who was received with cheers on rising to deliver the Presidential Address, cordially welcomed the delegates and recalled that it was his proud distinction to open the first International Co-operative Congress, which laid the foundation of the International Co-operative Alliance, "in London in 1895." Since then the Alliance has witnessed a remarkable and most satisfactory growth in the loyal and enthusiatic acceptance of Co-operative ideals by increasing numbers of the peoples of Europe and of the English-speaking countries at Home and over seas. The great growth in the Co-operative movement in Germany, England, Denmark, Ireland, and elsewhere since the date when we laid the foundation-stone of the Alliance justifies our confident expectation that the days of a new social order are at hand."

WHAT CO-OPERATION MEANS.

What are the essential principles which are common to Co-operators all over the world? First, that the Co-operative movement shall not be a class movement, nor a political movement, nor a sectarian movement. It is a movement of a purely social and voluntary character, which finds its origin and its strength in the natural and spontaneous promptings of the individual heart. The movement is not of the nature of a trust or combine, or of any other exclusive organisation. On the contrary, the Co-operative movement in its free and natural operation, unfettered by any State control and open to all, offers the most practical and effective safeguard that can be obtained against the possible tyranny of trusts and other organised minorities.

What is the nature of the benefit which the applications of the Co-operative principle to our industrial system claims to offer to the people? The application of the Co-operative principle to our industrial life has proved in England, the United States, France, Germany, Denmark and Ireland that, by the substitution of organised distribution for unorganised distribution, of Co-operative buying for individual buying, of Co-operative transporation and marketting for individual selling, and of Co-operative use of power for the individual use of expensive machinery, the wants of both producer and consumer can be met more effectively and at less cost.

Co-operation means the elimination of every unnecessary middleman. The vital interests of society call for his removal, and Co-operation shows how he can be removed. The principle of Co-operation requires that the

services of every necessary middleman shall be adequately and honourably remunerated, bu it also requires that every unnecessary toll taken from an article on its way from the producer to the consumer shall be removed.

CO-OPERATION AND INDUSTRIAL STRIFE.

But the benefits which Co-operation has in its power to confer upon our industrial communities are not only material in their character. The moral advantages which flow from the successful application of the Co-operative principle to our industrial and social life are not less conspicuous or important. The wants of society can never b e adequately met so long as the twin forces of capital and labour are warring against each other within the bosom of a single State. Co-operation shows how the warring forces of labour and capital can be reconciled with advantages to all concerned, the value of which it is impossible to over-estimate. It remains for all who have at heart the well-being of their follow men, to promote, as far as they can, the transition from present conditions to a social state in which the spirit of fraternal Co-operation shall prevail.

Co-operation in the Central Provinces.

The Second Annual Provincial Co-operative Conference for the Central Provinces and Berar was held on the 15th and 16th instant in the Victoria Town Hall, Jubbulpore. Sir Benjamin Robertson the Chief Commissioner, opened the proceedings with an illuminating address, from which we extract the following :—

First let me refer to the growth of the co-operative movement in these Provinces. Two years ago, there were in the Central Provinces and Berar 300 societies, with 9,000 members, and Rs. 5,00,000 working capital. There are to-day 1,580 societies, with 30,000 members, and a total capital of Rs. 38,00,000. During the fifteen months which ended on the 30th June last, the transactions of the co-operative banks and societies amounted to Rupees 1,26,95,000.

Now, gentlemen, I wish to impress upon you very strongly that Co-operative business is not the less *business* simply because it happens to be co-operative. Like every other kind of business in which large sums of money are involved, co-operative banking must receive careful and regular attention if it is to be successful. Unless your workmanship is accurate and painstaking in detail, the house of co-operation will soon prove that it has been built upon sand. Wherever co-operative banks have prospered, safety and caution have been the prominent features of their management ; and once you satisfy the public that your banks are really well managed, money will flow to them in abundance. Therefore, I say to you that, though we must advance, it is our first duty to make sure that our work is sound.

I imagine that the first question which an experienced man of business might put concerning the co-operative movement in the Central Provinces would be this—"Are your banks and societies thoroughly healthy or are they unreal growths forced by Government agency and without any vitality of their own ?" I myself put some such question when I returned to the Central Provinces as Chief Commissioner. For when I left them nearly seven years ago, the movement could hardly have been said to have begun. To find out for myself the answer to the question, I paid a visit to Sihora in this district in September of last year, and I went thoroughly into the work being done there under the guidance of Rai Bahadur Bishan Dutt Shukal and Rai Sahib Gurdin Misra, to the latter of whom I shall to-day present the Sanad and Badge of Rai Sahib, which has been conferred upon him by the Viceroy and Governor-General for his services in the cause of co-operation. Well, gentlemen, I found the results attained to be real results. I had up the members of societies in village after village—many of them were people I myself knew well in the six years I had served in the district, and I was able to speak to them plainly and straightly as their old Deputy Commissioner. I went through their books with them and talked about their affairs, and I came away absolutely satisfied that it was the real thing

that I had seen and that the people understood what was being done and meant to see that it was well done.

So much for my personal experience, but I should like to add a few facts and figures which bear upon the question put by our business man.

In the first place, co-operative banks and societies must not merely be borrowing institutions; they are intended to be "savings banks" as well. The Central Bank is there to tap the particular locality it serves, while the small village society must obtain and put into circulation the petty hoardings of its members. What degree of success has been attained in this particular direction? I find that a year ago, the investments made by members of agricultural societies amounted to Rs. 57,000. To-day they are Rs. 1,16,400. At the commencement of 1911 the deposits attracted by Central Banks were quite insignificant. In 1912 they rose to Rs. 1,12,000; and they stand now at over Rs. 5,00,000. The public estimate of the worth of co-operative banks can be measured very easily by watching the rise or fall of the deposits entrusted to them.

Secondly, gentlemen, let me examine a most important part of your banking machinery and review the growth of the reserve funds. In 1911, these stood at only Rs. 19,000, and in 1912 at Rs. 34,000. To-day they amount to Rs. 1,07,000. Although this increase is substantial, let me earnestly advise you to spare no effort to build up large reserves as rapidly as possible. Some of you have, I believe, been casting longing eyes on the reserve funds which you would like to apply to the upkeep of your paid establishment. A good, well-trained, and decently paid staff is, of course, an absolute necessity. But ample reserve funds are just as essential; and the Registrar's refusal at present to release reserves in order to meet current expenses has my entire approval and support.

Co-operation in Ireland.

In several ways, Ireland is a stimulating example to India. It can give many lessons to India as to what the latter may expec from the co-operative movement.

"The economic aspects of the movement is at the present most important, though later on it is probable that the social and political effects of the organisation of Irish agricuture will come to assume greater importance in the eyes of observers." It is the case in every country where the movement has at all found a permanent footing, that the habit of combination grows and indelibly affects national character. In Ireland, the dairy societies form the most important of these organisations, and they are, according to a summary of the *Times* Irish number published in the *Hindu*, 326 in number with 45,725 members, with 87 auxiliary creameries, doing business to the extent of over £2 millions sterling. Formerly, individual farmers had to skim cream, churn and market it, and sustain preventable losses. But now, the whole milk of the village is brought to the central creamery morning and evening, where the milk of each farmer is tested and weighed, payments being made once in a month. Scientific supervision is effected so as to prevent putrefaction. The shares are of the nominal value of £1 each, but generally only half the amount is called and paid-up, farmers taking one share for every cow they possess. The Joint Stock Companies advance the money required for setting up the machinery, costing about £1,200 or £2,000, at 4 per cent. per annum which is repaid out of profit in six or seven years' time, the entire profit thereafter being divided among the members in proportion to the value of the milk supplied by each member. There are 175 agricultural societies with a membership of 18,271 and they did business to the extent of £130,000 last year. They work on similar lines and supply members with seeds, feeding stuffs, potatoes, machinery, etc., and have the Irish Agricultural Wholesale Society as their central federation. A very important branch of their work is the co-operative purchase of costly machinery, such as threshing sets, corn cutters and binder, potato diggers. This aspect of their work is very popular, the

farmers, who generally own 25 acres each, hiring the machinery. This kind of co-operation is very useful in a country of small farmers and the *Times* correspondent instances the case of a Society which was enabled to buy up machinery of its own in this way. He writes: "In Limerick a body of small farmers raised £25 at the Bank for the purchase of a corn binder. The money earned by the hire of the binder bought two potato diggers, and the diggers earned the price of a manure distributor, and the last implement earned the price of a horse sprayer. These farmers now own upwards of £100 worth of machinery, and only owe the original loan of £25. Next year they will pay this off, and are contemplating the purchase of a power thresher, disc harrow, etc." There are also a small number of poultry societies. The tendency is however, for societies established for particular purposes to undertake all kinds of agricultural work as success is attained in their original business. The correspondent points out that "it is likely that in 25 years' time the entire agricultural business in every parish in Ireland will be carried on by one large well-managed Association, which will buy, manufacture, and sell for its members."

The number of credit societies last year was 236, with a membership of 19,505 and a turnover of £53,055. They are started on the Raffeisen model but unlike German Societies, they are not allowed to do also agricultural work and thus add to their profits. In fact, this disability is greatly felt and the legislation promoted with a view to remove it has not yet been passed. The outside market, especially joint stock banks, lend money to these societies at four per cent. and they in turn lend it to members at five or six per cent. The establishment of a central union for these societies is under consideration. The movement is non-political in nature, and has already attained great success.

The following remarks of the writer on the tendencies of the movement will be read with interest:—

"Agricultural co-operation in Europe has tended more to the specialisation of the functions of the societies. Dairy, agricultural, cattle insurance, cow testing, and poultry associations, and the unions for the provision of credit are kept more apart on the continent than they appear likely to be in the future in Ireland. By this fusing together of the functions of various societies we get in time to the true rural community—a modern counterpart of the ancient clan, only instead of the communal ownership of land, which was the basis of many clans, the new rural association will be inspired by the principle of community of effort. Already, while these co-operating communities are in the early stages of development, they begin to manifest some of the characteristics one expects from the fully organised clan."

Collection of Savings in Germany.

In Germany, there are both loan and savings banks, and the facilities which they offer to collect the savings of members and others are very many. The village banks, we read, make efforts to reach "all ages and classes in the district. Farm hands and servants are recommended by masters to deposit part of their wages with the Society; teachers in schools distribute savings books; savings boxes are given out free of charge, and in many cases Societies employ collectors who make weekly visits to houses for the sale of savings cards of different denominations (from 6*d.* up to 5*s*)." We are told that this method of collecting savings has been specially developed among the Societies attached to the Hessian Union, a total of £114,000 having been obtained in 1908 by some 180 Societies, representing 10 per cent. of the total deposits held at the end of the year by the 402 Societies in this Union.

Co-operation in Mauritius.

The Mauritius Government have applied for the services of an officer from India for three years, to organise Co-operative Credit Societies among the Indian population of the island, as a result of Mr. Wilberforce's recent visit to Mauritius.

The Industrial World.

Industrial Census of Bengal.

A Resolution of the Government of Bengal on the Report of the Census of Bengal, Bihar and Orissa, and Sikkim, 1911, referring to the Industrial Census says.—Extremely interesting results were obtained from an industrial census held concurrently with the general census. For mills, mines, etc., employing over 20 persons, a special schedule was prescribed and this was filled in by the owners or managers themselves. The total number of such concerns was found to be 1,466, employing over 600,000 persons, one-third of whom find employment in jute mills, and nearly another third on tea plantations. The great industrial centres are the districts of Calcutta, Howrah, Hooghly, and the 24-Parganas, where two-thirds of the industrial undertakings of the province are concentrated. Of the various industries, Indians own practically all the brass foundries, oil mills, rice mills, timber yards, brick works, etc., while Europeans enjoy an absolute monopoly of the jute mills and predominate in the tea gardens and machinery and engineering works. A noticeable feature in this connection is the large and steadily growing predominance of extra-provincial labour in these industrial centres. The Bengali is in a minority in nearly all, and most markedly in the jute mills.

Doll-making in Germany.

The old home of the doll is Thuringia, especially the town of Sonneberg, twelve miles from Coburg. Many of the poorer families in and around Sonneberg are engaged in the industry, which, according to the *Journal of the Society of Arts*, is the chief source of income of the population, giving employment for the whole year. The work demands a great deal of practice and skill, as well as time and trouble. The inhabitants start making dolls while very young, and by constant practice are finally able to work with astonishing accuracy and speed. Some make the bodies, others the heads, and others the arms, hands, etc. By this division of labour, the work is done much quicker and better. The heads are first moulded, and when sufficiently dry, the eyes are cut out by a skilled worker with a very thin, sharp knife. This is extremely delicate work, because all of the sockets have to be of uniform size or the eyes would not fit. After being burned, the heads are painted, waxed or glazed, depending on the material on which the heads are made. The arms, legs, and hands are produced in a similar but simpler manner, as the painting consists only in giving the necessary flesh colour, while the heads must have rosy cheeks, red lips, and dark or light eyebrows, depending on the colour of the eyes. The setting of the eyes and the making and attaching of the wigs involve a number of other processes. The doll industry is now commencing to make the " character doll " in restricted numbers. The model is made by an artist, and the moulds are then copied from this model. The painting of these dolls is done with especial care, and consequently their price is considerably higher than that of the commoner type of doll. The assembling of the different parts of the dolls is often very complicated. The best jointed dolls have stout elastic cord on the inside, to which the movable parts are attached. A special branch of the industry is devoted to the making of dresses and hats. The latest Parisian styles are copied in dressing the larger sized dolls, and the creations turned out compare favourably, in miniature, with the original.

Lubricating Oils.

The following extract from *Fibre and Fabric* will be read with considerable interest by all manufacturers who might have installed machinery :—

Oil costs money ; it is an important factor in the successful operation of machinery. The lack of oil or failure to properly care for that

in use is a serious matter and is, perhaps, more than any other one thing the cause of failure to secure maximum efficiency in machine operation ; and that loss costs more money.

SELECTION.

The selection of oils for the many requirements of a manufacturing plant is a matter which is worthy of, and is now receiving much more study than was the case a few years ago ; and the purpose of many expert and practical tests is to determine what lubricants are best for high, medium and low speeds, for light and heavy journal bearings, etc. Reliable oil manufacturers are prepared to submit the results of such tests and, for fixed and definite service, to guarantee results.

STORAGE.

To make the saving and low costs of oils effective to the highest degree, it is necessary, after the selection of oils has been made, to provide suitable means for properly storing and issuing them. The common plan of keeping oil in barrels is especially wasteful. It has been well said that barrels are for transportation, not for storage purposes. The loss by storage, evaporation, absorption, non-drainage of barrels, and from faucets would be appalling if realized by the men who pay the bills.

RE-USE OF OIL.

An important phase in oil and manufacturing economy, when the character of machinery renders possible the necessary equipment, is the re-use of oil. To re-use oil, it must necessarily have all impurities that will cause damage removed, else the re-use will result in actual loss. In many plants the oil used is caught and again used on rough work, where the impurities will do no appreciable damage.

In modern practice, the so-called "sufficient" lubrication is no longer considered adequate ; flooded journals are demanded and the highest economy requires the re-use of oil. No half-way provision is tenable, and if oil is to be re-used, there is no object whatever in restricting its use. The expression "the more oil you use, the less you lose," is wholly correct for oil losses are due to destructive distillation at the journal. A greater quantity of oil produces less friction, therefore less heat and less distillation loss. The friction losses are governed to a very large extent by the quantity fed.

To secure satisfactory service in re-using oil it must be thoroughly cleansed. Old oil is not different from new if the impurities be removed. Petroleum oils never wear out, any more than water, but the lighter properties can be lost by distillation, which may occur at the temperature of an improperly lubricated journal, and to avoid this, it is necessary to keep journal temperatures low, or, in other words, reduce friction by the use of large quantities of oil. The re-use of oil is now common in nearly every factory, by using ring-oiled bearings. Nobody looks upon this as much of a hazard, but if the dirty oil were taken out of the ring-oiled bearing and put into an oil cup on some other machine it would surely be looked upon as unwise and dangerous. As a matter of fact it would be both.

In the case of ring-oiled bearings, as the impurities increase in quantity they retard the flow of oil ; and if the oil is not drawn off and bearings cleaned out, it will cause serious cutting of the journals.

RING-OILED BEARINGS.

Oiling systems and ring-oiled bearings have come into use during the life of the present operators and have met with opposition from the start. The first obstacle was the general prejudice against re-using oil ; and following this was the reluctance of manufacturers to make up new patterns suitable for the re-use of oil. Bearings for line shafts were first arranged for grease, then for wick or capillary oiling and now the use of ring, chain or collar oiling is quite general throughout the factory. The general tendency in the matter of oiling shafting is correct as all general tendencies are bound to be. Light oils in abundance are the friction savers and savers of machinery, and to make this system a perfect success it is necessary to eliminate as far as possible the re-use of dirty oil. The

continuous circulation of a very large quantity of clean light oil is the last word in lubrication; it assures the greatest benefits possible and at a cost not greater, and in most cases much less, than the poorest lubrication that will barely keep the journals from destruction. These facts being fully appreciated, it is then wholly a matter of application.

But little has been said in regard to the machines in the factory. If the bearings be small, requiring but little oil, and no provision has been made for flooded lubrication, it is safe generally to assume that the economies to be derived will not justify the expense and complications which would be met, but in securing new equipment an effort should be made to have stream feed or ring-oiled bearings. In many cases the hand oiler must continue, and it must, in fact, be conceded that in the textile mill the conditions are such as to make this method necessary, but many special devices for safely storing and handling have been designed as the basis for conserving the oils, to minimize the cost and assure ease and accuracy in handling, to preserve the quality, to keep the oil free from dust and lint and to reduce the fire hazard to the minimum.

THE COMMON METHOD.

The common method of distribution in mills is by means of tanks of 10 to 60 gallons capacity in the different departments, the sizes depending upon the judgment of the management, some preferring few large tanks while others prefer small tanks placed at more frequent intervals. The latter plan is very satisfactory as the small tanks can be removed from the mill for filling at the storage-house outside, and in the mill are more conveniently located for the operatives.

The whole subject of oil handling and lubrication efficiency is now recognized as one of great importance, as is shown by the consideration and study which has brought about the development of special apparatus and the investment of capital in its manufacture to meet the needs and demands. It is a subject large enough to warrant the attention of every manufacturer and the advice of experts, for it is directly and indirectly a considerable factor in the cost of operation and production, and upon efficiency depends dividends.

India's Industrial Advancement.

Mr. P. F. Vas, L.C.E. State Engineer, Sangli, writes on the above to a recent number of the *Indian Review*.

The Tata Iron and Steel Works and the recently started Cement Manufacturing Co. open up a large field of possibilities for the general amelioration of the condition of the people, not the least of which is that it brings the solution of the house problem in India within sight. This is rendered possible by the new material Ferro-Concrete which consists of cement concrete with steel bars or netting embedded in it.

Agricultural and labourers' cottages, farm-houses, village halls, dharmashalas, small mosques and temples can be convenienty and economically built of this material. To go further, the same material can be utilised for the construction of wells, tanks, cisterns, grain-silos, stables, fence and telegraph posts, and even barges and pontoons.

A concrete building is not subject to deterioration, it is fire resisting, clean, white ant proof, and will stand the severest weather. Needing no repairs, it seems indeed to get stronger with age and requires a dynamite to remove it. The first cost is the last cost. From the sanitary point of view, a cement building can be washed down, scrubbed, disinfected, steamed or sterilised, so as to destroy all germs, while it can be kept clean with the least expenditure of labour.

Cheap cement gives us excellent cement and sand floring bricks and roofing tiles at a small cost. The importance of a good roofing tile will be patent to any one. An enthusiast can go still further and raise crops on his roof. A store at Calais with a large area of flat roof has been covered with a 12-inch layer of soil with open drains under so as not to allow the soil to become overcharged with moisture. A good hay crop is obtained from this roof every year.

The usefulness and necessity of cement

being thus fully established, it only remains to add that factories for its manufacture should be multiplied in the country and the product made easily available to the public at a low rate.

With model dwellings not scattered in a haphazard fashion, but built with due regard to the science of planning towns and villages, sanitation and water-supply go in as handmaids.

The removal and the disposal of refuse is a work demanding close attention.

It would be interesting to know in what way refuse is disposed of in other parts of the world. In Glasgow, for instance, part is sold to farmers ; what does not sell is burnt in incinerators and the heat of the conflagration generates electricity, drives machinery, provides steam and hot-water for stables, baths and lavatories. The waste products are a source of revenue, clinkers, old tins, waste papers, etc. In certain towns of Great Britain, France, and Germany, grease is extracted from sludge and the residue used as manure or treated to yield sulphate of ammonia and gas.

The improvement of the village brings us to the subject of improvement of the land and enhancing the value of its products. The two factors that enter into this are fertilisers and cheap transport to the most extensive markets. Among the cheap means of transport, Railways and waterways take the foremost place.

The mono-railway, the cheapest form of rail transport is still in an embryonic stage and a successful form of it has yet to see the light of day. One type however on the Lartigue system, appears to have met with some success. A short length of 9 miles of this mono-railway has been working satisfactorily for the last 20 years between Listowel and Ballybunnion in Ireland. It was at one time intended to construct a railway on this system between Manchester and Liverpool (34 miles) for fast passenger service.

The development of inland waterways is a question of no less significance. Fabulous sums are spent in Germany and America in this direction for providing the people with a cheap means of transport.

The enormous consumption of coal and oil and the enormous waste of coal in mines threaten the speedy extinction of both kinds of fuel. And water power has been seized as the maid-of-all work and pressed into the service of man, and its development in recent years has been truly wonderful. In Scotland, the British Aluminium Co. has constructed a reservoir at a cost of 1½ million sterling and after conducting the water through 3½ miles of ferro-concrete conduit to the edge of the precipice, it is let down 900 feet by pipes to the power house. The Americans have constructed at a cost of a million dollars a dam across the Mississipi from which they expect to generate 200,000 H.P. to be distributed over an area of 137 miles radius. In our own country, we are familiar with the Mysore and the Tata hydro-electric schemes. Many interesting examples could be quoted to show the abnormal strides made in this direction all over the world. Countries like Norway, Sweden and Switzerland have magnificent resources for the storage of water for power purposes. In the case of Switzerland, all coal has to be imported. Hence it possesses the largest Hydro-electric power in the world.

In India, there is no question that practically the whole of the Punjab could be supplied with power from the Himalayan streams, while throughout Southern India there is hardly a section which could not draw power from some one of the streams of that well-watered plateau.

The great advantage and cheapness of water power can best be illustrated by the example of Southern California which enjoys the benefit of a cheap oil fuel and the rainfall averages but 13 inches in the year and water-power sites exist only from 60 to 200 miles from the consuming centres. These conditions are unfavourable enough for water power development ; still that portion of the state has for the last 15 years set the example for the rest of America in hydro-electric progress and to-day as a result, electricity is furnished to the

smallest consumer in an obscure S. Californian village at from $\frac{1}{2}$ to $\frac{1}{3}$ its cost in the largest cities of India.

It is not to be understood that only huge streams are to be utilised for power production; small streams and rivulets can be harnessed to generate electrical energy for the farm and the house.

At *Lawyersville, New York*, a little farm plant consists of a 9 in. up-right turbine of 5 H.P. running with a 15 ft. head. The dynamo which is a 4 H.P. machine will take care of 60 ordinary lights, will drive a milk separator, milk the cows, turn a grindstone, fanning mill or feed grinder, cut the ensilage or drive a dozen other small machines. It is capable of doing the work of three hired men and will furnish all the comforts of electric heat and light besides, at a very insignificant cost for maintenance. The installation costs something like this, dynamo £26, turbine water wheel £12, water wheel £11, water wheel governor £15, line wire £18, total cost £70, less than the year's wage of a hired man.

Where water is scarce, farmers are utilising their windmills to generate Current for light and power. There is a great future for these windmills in India if by local enterprise the cost of manufacture could be brought down to a small figure.

In California, the sun is harnessed to develop electric power for farm work. Huge reflectors follow the course of the sun and focus the rays on a boiler. The steam is conveyed to a small engine which drives the generator. The power of the tides is also employed to generate electric power.

Another type of engines called suction gas engines run with gas produced from any rubbish wood, charcoal, peat etc, have recently appeared in the field and by their low cost of working are ousting other prime-movers; their consumption of wood being about 21 lbs. per B. H. P. against 8 or 10 lbs. in steam engines. In Manchester there is an installation in a saw mill of a plant worked by gas produced from saw dust. At Mirigama in Ceylon a suction gas plant working on cocoanut shell gas has been found to give good results. In the Poona District a suction gas plant run on charcoal produced from babul wood has been installed for irrigation purposes.

Lastly mention may be made of alcohol engines which have a low workng cost. In Germany they are run on alcohol made from potatoes and other root crops They have a great future in India where raw material for making alcohol is found in abundance; one of the best known being the cashew fruit found in abundance in South India. At present millions of tons of these fruits rot away in the gardens. By securiug the good will of the Excise Department a profitable industry could be established here.

Industrial Efficiency.

In a paper presented at the Fifth Annual Meeting of the American Institute of Chemical Engineers, Detroit, on the above subject, Mr. W. M. Booth gives his view of manufacturing economics from all standpoints.

The first and highest type of endeavour concerns itself with the invention of new processes and the perfection of these, establishing useful industries later. Relatively few men have the ability, courage and means to embark in totally new enterprises, and the larger percentage of those who do so, fail, because these three important elements are not properly balanced.

Not less important, but demanding a different type of mind, perhaps more strongly analytical in its nature, is the large and ever-increasing field open to those who are able to improve or effect economies in the processes of firms already established. Closely related to this is the examination of new enterprises that seem to have merit and which need scientific assistance and capital for development.

In all new industrial enterprises, the chief concern should be with questions of process, cost, market, location and actual capital needed. No considerable investment should ever be made without a complete report from conservative men, who are familiar with the industry involved.

Many failures in business can be averted if some general plan of efficiency survey is adopted. According to Mr. Booth, such a plan must recognise the following conditions.

EXTERNAL.

Policy of the Government towards an industry. Capital upon which dividends must be earned.

Location.

Cost of plant and equipment.

INTERNAL.

Unit cost of finished product, subdivided as follows:

Raw materials	Supplies	Fixed charges
Labor	Office expenses	Interest
Power	Repairs	Depreciation
Lighting	Sales	Insurance
Heating	Advertising	Taxes
Cartage, freight	Charity.	

Considering the capital invested, and the importance of the manufacturing business to all the people, laborers, tradesmen and stockholders, the Government is bound to respect, foster and protect these interests at all times.

LOCATION.

In the matter of location, the manufacturer generally follows his market. The direction of the growth of the population, changes in market conditions and the peculiar elements which are termed economic conditions largely determine location. "No science or art can determine with accuracy whether economic conditions are correct for the location of an industry. Accident or good business judgment may accomplish what statisticians and scientists cannot."

But to aid those who wish to study the problems of location, Mr. Booth has made a list of the elements that seem important. They are :—

Accessibility of raw materials	Climate
Market	Hygienic conditions
Transportation	Taxes
Labor	Insurance
Power	Banking facilities
Water	Heating
Supplies	Lighting

Obviously, all of these details cannot be discussed in a general paper. The importance of one item, water, requires special consideration, and shows very clearly how carefully capital should investigate a new location, when the growth of a business warrants a a change or when misfortune requires it.

COST OF PLANT AND EQUIPMENT.

With plenty of money at his disposal, writes Mr. Booth, the optimistic manufacturer is apt to spend too great a portion on buildings and equipment. Ample working capital should always be held in reserve. The amount thus employed will necessarily vary with the business, but from 25 to 50 per cent is commonly set aside for this purpose in smaller industries, the capitalization of which is from $50,000 to $200,000.

It is much better to build a plant in a modest way anticipating growth, than it is to find capital for running a concern in the midst of business expansion; especially so, if stockholders have had to wait from three to five years without dividends.

In manufacturing, the ideal is approached when the largest quantity of good is turned out at the lowest possible cost.

To determine how to attain the above conditions is the duty of every executive. But the task is not a simple one, for book-keepers are not statisticians, and although all of the data necessary in connection with the proportioning of expense in the manufacture of an article may be derived, it takes a large amount of study to draw correct conclusions. In Mr. Booth's estimation no simpler expedient has been devised in this connection than unit cost.

What does it cost to produce a pound, a horse-power, a barrel, a yard, or a machine, any single article, many of which are made each month or year? These items may be apportioned as percentages. The separate items under fixed and operating expense become factors of the total. As an example, we will say that the production of a machine has entailed an outlay of $25·00 and that this is divided as follows :—

	Per cent.		Per cent.
Raw materials......	20	Repairs...	1·3
Labor..	40	Sales.....	10
Power..........	7	Advertising..... ..	5
Lighting and heating	1	Charity............	0·2
Transportation	3	Interest, depreciation,	
Office expenses......	2·5	taxes and insurance	10

This outline shows at a glance that labor is a large item in the cost of this article and that any economy that can be effected in this department will make an appreciable saving in the total outlay.

STOCK AND SUPPLIES.

In the matter of stock and supplies, Mr. Booth has some pertinent suggestions to make. Every successful enterprise requiring raw stock must include an expert buyer of large experience, whose business it is to make a study of market conditions and fluctuations. Ten years ago, much more practical experience was required to fill such a position than at present. This has been brought about by the general introduction and use of specifications. One by one, natural products have been standardized; coal, wool, cotton, ores, oils, paper stock, iron and steel and natural earths; these are a few of the hundreds of raw materials used by manufacturers. Physical and chemical standards have been set to replace the guess and estimation methods that came from experience and that are often wide of the truth. A relatively inexpensive man who has a testing laboratory at his disposal can determine the actual value of raw stock much more accurately than some high priced man can guess at it. Two items on our cost sheet can be turned downward and kept there at relatively small expense.

Unless the specification idea is carried throughout the mill to include the finished product, the work is incomplete, for the adoption of such a system invariably improves the quality of the goods turned out. For example, every piece of wood, of composition and metal that goes into an automobile or locomotive should be of the best quality, proved to be so by actual experiment. This rule holds for all products.

Referring to the *personnel* of the purchasing department in the mill organization, Mr. Booth complains that this important branch of the business is often left to incompetent clerks, who antagonize salesmen generally and who buy from men from whom they get the greatest possible return, gifts, dinners, an occasional trip, or even money. Honest travelling men avoid such purchasing agents, to the permanent loss of the business.

Every manufacturer uses mixtures and compounds, of the exact nature of which he has no knowledge; oils, dyes, fillers, adhesives, cleaning agents. waxes and polishes, powders and salts.

Good business requires a knowledge of supplies and their component parts, for the purpose of keeping the cost down, for the protection of workmen, and to guard against fire.

No feature of factory economy should be as closely watched as the storeroom. A storekeeper should be in charge every moment of the working day, and should be held responsible for all stock handled, distributing this over a counter only, and never allowing workmen to come behind this. All orders should be signed by proper authority and a carbon copy of each transaction kept. Tools, in particular, and all stock that can be used about home, barn or garden will mysteriously leave the plant a few cents worth at a time, if a way is found to handle the matter with an easy conscience.

CONCLUSION.

The forgoing are some methods that can be adopted in the conduct of any manufacturing business. The days of large profits, cheap raw materials and labour have gone for good. With increasing prices and competition, all executives must be economists as well. Efficiency, in its broadest sense, should include promotion, capitalization, location, organization, equipment and operation. Great stress has been laid on the efficiency of labor to the exclusion of matters of equal or greater moments. An exact knowledge of unit costs will reveal the weak points in any plant. The so-called efficiency

engineer who spends three or four days in a concern and antagonizes everyone from the bosses to the office boy, can accomplish little good. Weeks and months of study are required to get at the details of the business ; to make improvements is a still greater task. The good will of the employees must be gained and kept to make any progress in economy studies. Discussion and argument naturally follow any change in policy. The man who makes the change should be there to defend himself and drive home his view point.

How Matches are Made.

"How Matches are made" is a useful little book telling the reader how to manufacture matches. The non-technical student is greatly helped by the employment in the book of profuse illustrations which are at once clear and distinct. The book can be had of A. Janowitzer, who is the sole agent for India and Burmah and has offices in Calcutta, Bombay, Madras and Rangoon.

Weaving in Madras.

Mr. N. Subramanya Iyer, Superintendent Peripatetic Weaving Party, has brought out in pamphlet form, his paper on "Weaving in Madras," read at the eighth annual session of the South Indian Association. It gives the early history of weaving in India and its subsequent progress after trade with Britain began. The brochure contains many useful suggestions as to how the industry may be improved and how the many defects found in the present-day weaving methods in Madras may be removed.

Preservation of Eggs.

For preserving eggs, it is preferrable to adopt methods based on the use of animal or vegetable fat, and especially those where the eggs are embedded in soft fat in such a way as to exclude all passage of substances from outside. Before the eggs are coated with fat, they should be sterilized with a o. 2 per cent. solution of fluoride of silver. The material for coating is compounded according to the following formula :

Earthnut oil	... ...	14	kr.
Palm oil	... ...	20	,,
Cocoanut oil	... ...	16	,,
Prepared laid	... ...	47	,,
Spermaceti	... ...	2	,,
Trioxymethylene	... ...	1	,,
Powdered thymol	... ...	0·05	,,

This mixture prepared over a slow fire acquires, when cold, the consistency of vaseline and is as easy to manipulate. Eggs preserved in this way had the same appearance and taste after 18 months as so-called "new-laid eggs." This system is adopted at a small factory near Ghent, where about 26,000,000 eggs were preserved last year, the work all being done by hand and almost entirely by women. The cost price of the mixture to coat 100 eggs is not more than 6d, and the preserving cost does not exceed 1s 8d per 100.

The Efficiency of the British Workman.

The statement once made BY Mr. Edison to an English visitor that the efficiency of the British workman is far below that of the American is suggestively illustrated in a Report issued by the American Secretery of Commerce, Mr. Redfield, for the use of the Tariff Committee of the Congress. The Report strives to show that despite the higher wages paid in America to individual workmen, British manufacturers incur greater expense in wages, because British workmen are less efficient and therefore have to be employed for a greater number of years to produce the same results. On the average, according to investigations of seventeen industries, Britain uses one-sixth more horse-power in machinery and two and a half times more workmen than America to create a unit of £20,000 increase in the value of raw materials. In the silk industry, Britain uses twice the amount of machinery and three times more workmen than America to produce a unit of £20,000 increase in value.

The Commercial World.

Imports of Motor-Vehicles.

BOMBAY spent the largest sum of money, viz., Rs. 51,41,581, in the purchase of motor-vehicles last year. Bengal comes next with an expenditure of Rs. 28,26,470 ; and Rs. 10,46,031 goes to the account of Madras which comes third in the list.

Business Enterprise in India.

The business enterprise of India during the the month of June 1913 is shown by the following abstract of Joint Stock Companies registered in that month.—

	Rs.
8 Banking and Loan Companies ..	1,20,79,360
4 Insurance Companies ...	80,000
3 Printing, Publishing and Stationery Companies ...	60,000
9 Trading Companies (other than specified above) ...	15,83,000
2 Cotton Mills Companies ...	13,00,000
1 Jute Mills Company ...	15,96,000
1 Cotton Planting Company ...	1,00,0000
1 Sugar Manufacturing Company...	1,05,000
29 Grand Total ...	1,69,03,360

The Commercial Congress.

At the annual meeting of the Bombay Indian Merchants' Chamber and Bureau the Hon. Sir Fazalbhai Currimbhai made a spirited appeal for support for his scheme for an All-India Commercial Congress. He said :—" The three greatest needs of our country at the present day are, education, sanitation and industrial growth. They are all mutually dependent. Without an educated and physically capable population, industrial development cannot proceed very far. On the other hand, without economic prosperity which can come only from the growth of industries we connot get the resources necessary for large schemes of education and sanitation." Mr. Currimbhai further explained that the economic question is at the root of national progress and it has a value from a national and patriotic standpoint. He said that the congress such as he had sketched was a supreme need of the hour. Indians wanted a Congress of the kind which he suggested, first of all, to enable this great country to have her voice heard in the counsels of the Empire, in the settlement of the grave economic issues which have been discussed for the past ten years and more.

The World's Paper Production.

IN 1882 the total world production of paper was estimated to be 2,365,090 tons of which the United States produced 530,000 tons ; the United Kingdom, 470,000 tons; Germany, 450,000 tons and France, 380,000 tons. In 1909 the United States alone produced twice as much as the whole world did in 1882. According to the latest available statistics the United Kingdom produced 900,000 tons in 1907; Germany, 1,509,000 tons in 1909; and the United States, 4,216,000 tons in 1909.—*The Paper Maker's Monthly Journal.*

The Watering of Cotton.

It was stated in the House of Commons the other day that Lord Crewe is again going to ask the Government of India if legislation cannot be undertaken to check the watering of cotton. It is admitted by those who know that the brazen way in which cotton amongst other things is adulterated with water for the purpose of adding to its weight is little short of a public scandal. It is very well known to all cotton dealers, and to a large section of the general public as well, that in cotton districts there are elaborate pump and hose appliances by which the cotton for sale is without any attempt at secrecy saturated with water that is not always of the cleanest, the idea being to cheat the buyer by selling him water for cotton at so much a pound ! Any anti-Adulteration legislation to penalise such practice will be hailed with joy by all cotton buyers.

Initials as Trade Mark.

A decision of great importance to commercial circles was recently given by the House of Lords. The appeal was that of the Registrar of Trade Marks from a judgment of the Court of Appeal reversing an order made by Mr. Justice Eve, who had confirmed the decision of the Registrar, that mere initials could not be legally accepted for registration as a trade mark. Messrs. W. and G. du Cross, the well-known motor car dealers, had applied for the registration of a mark which consisted of the letters "W. & G.," and it was contended that those letters written in cursive characters with a somewhat bold return flourish at the end of the letter "G" and with the interposition between the two letters of the conjunctive symbol, formed a design which was registrable. The Court of Appeal, Lord Justice Farwell expressing some doubt, thought that the letters written in the way described, but not *per se*, were registrable, and ordered the Registrar to proceed.

An Imperial Exhibition.

It is announced that an Imperial Exhibition promoted by the British Dominions Exhibition, Limited, will be held in London in 1915 with a view to showing the Empire products and creating a better market throughout the Empire. The year 1915 has been chosen because of the Imperial Conference, and because it is expected that the Empire Trade Commission's Report will be published then.

The scheme has received general support from many distinguished officials in England and the Over-Sea Dominions.

It seems that India would go without representation in this Grand Imperial Exhibition as in the Imperial Conference of last year, as no steps have been taken hitherto to include Indian products. When it is remembered that India is the fattest customer of Great Britain, the indifference with which India is treated is regrettable. We hope with the "*Times of India*," that this defect will soon be remedied.

Machine *Versus* Horse.

The average working life of a horse, or any other draught animal, naturally depends upon the amount of work it is called upon to perform and the conditions under which it has to work, but six years may be considered as quite a good average for a horse, given the best of conditions, and during its working life it will cover a total of about 35,000 miles. There are many records which go to prove that the average working life of a good commercial vehicle can be estimated at between 120,000 and 150,000 miles, and at all periods of its life the motor wagon can easily cover 100 miles a day, a distance which a heavily laden pair-horse van would scarcely accomplish in three days. Thus we see that the commercial motor vehicle of to-day can accomplish six times the work of one horse, and, on a mileage basis, its working life is at least four times as great.

The Carat.

Why gold should be measured and diamonds should be sold by the "carat" is something of a mystery.

The gold carat seems to have no particular relation to the diamond carat. In gold, so many carats mean simply so many twenty-fourth parts. Gold that is eighteen carats fine is eighteen—twenty-fourths gold; and if it is twenty-four carats fine, it is pure gold.

The diamond carat is "something else again." The American Consul at Antwerp, Mr. Diederich, writing to his department about diamonds, points out that until recently the diamond carat varied in different countries. In London, it meant a weight of 250·4 milligrams; in Paris, of 205·7 millgrims; in B rlin, 205·44 milligrams; in Austerdam, 205·75 milligrims. In the last few years a carat of 200 milligrams has been adopted in France, Italy, Roumania and Spain, and also, to some extent, in Belgium, Holland and Austria-Hungry. We now learn that the Decimal Association have announced that the Standards Department of the Board of Trade has decided to make the metric carat of 200 milligrams and its necessary multiples and sub-multiples stand-

ard weights in the United Kingdom. The order giving effect to this decision will probably be issued before the end of the year.

The Value of Magazine-Advertising.

There is no doubt that the value of a magazine to an advertiser depends greatly upon the character of the contents. A magazine which is bought simply as "something to read" offers very little inducement to the reader to look at the advertisement pages, but a magazine that is bought, because it contains something useful, because the contents are dealing with the wants of every-day life, because assistance, practical suggestions and advice are given, cannot fail to be of very great value to an advertiser. The advertisement pages then become an essential part of the magazine.

So says a writer in the *Printer's Ink*; and assures every advertiser that there is not a single $\frac{1}{16}$ page magazine advertisement which is not seen and noted by fully 90 per cent. of the readers at some time or other. For an immediate splash the dailies are unrivalled, for a season's trade the weeklies are excellent, but for the man who is not anticipating immediate or near disruption to his business, and who seeks to lay a sound basis for the continuity of his trade, the monthly holds the crown and offers an ever increasing volume of floating publicity which nothing less than an earthquake can delete.

New Uses for Cocoanuts.

Mr. Rowland W. Cates writes in the "*Financier*":—

Certain clever chemists, have succeeded in removing the peculiar and clinging cocoanut taste, and, similarly, the tendency of the oil to become rancid, with the result that a tremendous field for the article was at once opened up. From comparative obscurity the article has become one of prime importance, and its present-day uses are manifold. For instance, it plays to-day just as important a role in the manufacture of soap as it ever did: the "meat" is still desicated, ground and shipped to Europe and America in huge quantities for use in the bakehouse and kitchen. In addition there are a host of newer directions in which cocoanut oil figures. In medicine it now takes the place largely of animal lard in the composition of ointments and pomades, and while more palatable than cod-liver oil, it is said to be just as effective in the treatment of phythisis and like maladies. Its absorption of water more readily and in greater quantity than most fats has brought about quite a revolution in the manufacture of margarine, for which purpose it is now very extensively used, and it was not long after the discovery of this new use, that experiment, carried still further, revealed methods of making from the oil butter every whit as good and wholesome as butter made from cow's milk. Then we have cocoanut lard, which in appearance and general properties so closely resembles the animal products that few persons would detect any difference. Cocoanut trees do not develop tuberculosis, cancer or other dread scourges and nut lard made up in sealed tins, does not remind one of the none too cleanly habits of the pig as does a bladder of animal lard. Moreover the former will keep almost indefinitely. Another present-day use is in the manufacture of the white "cream" contained in chocolate creams, while nut salad-oils are just appearing upon the world's markets. There may be, and probably are, other uses for the oil with which the writer is unacquainted.

Packing and Transport of Fruit in India.

Mr. Albert Howard, M.A., A.R.C.S., F.L.S., Imperial Economic Botanist, Pusa, and Mr. Gabrielle. L. C. Howard, M.A., Personal Assistant to the Imperial Economic Botanist, contribute an article on the above subject to the July number of the *Agricultural Journal of India*.

The paper deals briefly with the packing and transport of fruit in India, and draws attention to some of the improvements which can be made, at once, in the present methods of this trade. The general conditions under which fruit is grown and transported in India must be borne in mind. The methods of production are primitive and the crops obtained by the people per unit of area fall be-

low what is actually possible, both in quantity and quality. The packing and transport of the produce to the railway are equally primitive. The distance to which fruit can be sent by the present methods is comparatively short. These causes seriously limit the market open to any fruit tract, and diminish the number of possible customers.

In the production and transport of fruit in India great improvements can be made. Experience indicates that a great field for development is open without expensive means of transport and storage, and that the road to success lies rather in the direction of better methods of production and packing,

PRESENT METHODS OF PACKING FRUIT.

There is a great similarity in the methods of packing fruit for the market. Fruit, of all kinds, is always picked green and unripe. The want of attention to pruning, and the close planting of trees render the damage in picking very great. The crop is shaken off the branches and a good deal more bruising takes place when the fruit is heaped up before packing. The packages used for fruit are for the most part ill-adapted for the purpose. There is a general absence of ventilation in all the packages. The packing material used is often unsuitable. The upper layers of fruit press on the lower and a good deal of crushing and bruising takes place. The packages are often non-rigid and one crushed out of shape in transit.

The facilities for carrying fruit on some of the Indian Railways are excellent. Well ventilatated fruit vans are in use on some Railways. But the material carried by these vans leaves much to be desired. In the markets themselves, a good deal of further damage results. There is little wonder, therefore, that the final product presents a battered and bruised appearance, and that good fruit is so rarely seen in India.

EXPERIMENTS AT PUSA AND AT QUETTA.

The first of these experiments related to the packing of Bihar peaches. The packages adopted were round, flat-bottomed, bamboo baskets, about 5½ inches high, fitted with flat lids. Into these, two tiers of small, circular, bamboo cells, for the single selected peaches, were fitted ; the two tiers being separated by a flat, circular, open-work, bamboo partition which could be dropped into the basket to serve as a floor for the second tire of cups. The lid, when wired on, served to secure the upper tier, and also to keep the whole basket, and its contents, rigid. Theft was prevented by sealing the wire by means of a lead seal, in the manner adopted in the Kulu apple baskets when sent by parcel post. Each basket contained about 25 bamboo cups and thus served to carry that number of peaches. These baskets were made by the local *domes*, for four annas each. If required in large numbers the contract price would be considerably less than this.

A little *san* fibre, covered with gunny, provides a good padding on a table for packing purposes. The *san* should be wrapped round each fruit, and the whole should fit well into the cell, without any shaking.

Venesta-Wood Fruit Boxes.—The next step in the fruit packing experiments consisted in the trial of returnable fruit boxes at Quetta-in 1911. A concession was detained by which the senders of fruit boxes of standard size were granted the free return of empties on the North-Western system. But the returnable venesta boxes with *pish* cells did not prove successful, and were not taken up by the local fruit merchants.

Experience with these boxes in 1911 showed that, under the present railway rules, any merchant sending large numbers of returnable packages on the Indian Railways would have to keep at least one extra clerk to file claims and to conduct the additional correspondence that would ensue with the Railway Company.

Non-returnable Fruit Packages.—In 1912, it was decided to work largely in the direction of light, non-returnable packages, and to avoid altogether the difficulties connected with the return of empties. It was soon discovered, however, that these boxes, although sound in principle, were quite un-

suited to India, on account of the Railway rules in force, by which each package is charged for, separately, according to a scale of weights. It was evident that the packages would have to be made to fit the rates, and accordingly all those likely to be of use were re-designed. The following packages were designed—.

(1) Peach crates, with chip compartments, to come under the five-seer rate.

(2) Grape boxes for small consignments.

(3) Various forms of climax baskets for local use.

(4) Non-returnable crates for the wholesale trade.

(5) Returnable crates, for short journeys on the North-Western Railway and for carrying fruit on camels.

Peach crates—as is used for fastening papers. The peach crates are packed in the same way as the bamboo cells of the Pusa peach baskets. Each selected peach is wrapped in thin paper, and then in a little *san* fibre—the whole being placed in the compartment so that there is no movement in any direction. The upper laths are then nailed on, and the crates secured by means of string or wire and sealed with a lead seal. In securing with string it is best to cut a small groove at the corners, so as to prevent slipping. One great advantage of these peach crates is that the compartments are machine-made, and fit the outer crate accurately.

Grape boxes.—These boxes were tried with *san* fibre as packing material and proved successful. When packed for long distances the bunches of grapes should be wrapped in thin paper and packed a little time after picking. The packing must be rigid. These grape boxes are clean and light.

Climax baskets.—A number of different kinds of climax baskets were imported from Glasgow. These baskets are exceedingly neat and clean. They can also be used for taking fruit for Railway journeys. They are so cheap that they can be thrown away after the journey. On account of thefts in transport, these baskets cannot be used for sending fruit by Railway.

Non-returnable crates—For the wholesale fruit trade in India, there is no doubt that a suitable non-returnable crate is greatly needed at the present time. Some attention has therefore been paid to this matter during the past two years. As a result, a cheap, light, non-returnable crate, has been designed and put on the market. By this means, tomatoes, grapes, and peaches were successfully sent from Quetta to Calcutta in 1912 without loss or damage in transit.

For long journeys, non-returnable fruit packages must be strong, light, and cheap and there must be good ventilation; they should be as attractive as possible and should look clean and fresh; the weight when filled should not be too great, and the cases should be easily handled by the Railway staff; the package should be capable of being closed, rapidly, in such a manner as to make thefts in transit exceedingly difficult; the fruit must be packed sufficiently tightly to prevent any movement in transit, and the upper layers must not press on the lower; further, the boxes must be able to travel equally well in any direction. These conditions were fulfilled by the use of these non-returnable crates.

These crates, which measure $24 \times 16 \times 13\frac{1}{2}$ inches and weigh $5\frac{3}{4}$ seers, contain 24 punnets, each $7\frac{1}{2} \times 7\frac{1}{2} \times 3$ inches, arranged in four layers separated by floors. Six of the punnets exactly fit the crate, and a light floor, made of laths and fixed together kinds of fruit and several sorts of out of season vegetables in addition—such as peas and beans, which are not seen in India during July, August and September. In 1912, several mixed consignments of peaches, plums, grapes, tomatoes—as well as peas and beans—were sent from Quetta to Calcutta and Simla. Several of the Quetta fruit dealers are considering how they can make use of these mixed consignments in extending their business with India.

One further advantage of this method of packing should be mentioned. This relates to the ease in marketing when fruit is sent in units. These small packages save an enormous amount in packing these crates, several points require

attention. The fruit should be carefully picked in the early morning, when cold, into padded trays or baskets, and the grading and packing should be done on padded tables, in the shade, so as to prevent bruising. Delicate fruits, such as peaches, nectarines, grapes, and tomatoes, should always be wrapped in thin paper before packing. This not only prevents damage, but also delays the rise in temperature of the fruit, on the journey through India. Wrapping checks the ripening process during the journey, and lengthens the life of the produce.

A further advantage of this method is that it saves an enormous amount of time in unpacking and selling when the market is reached. The way in which fruit is exposed for sale is an important part of the business, and the more attractive the unit the better.

Returnable crates.—For short journeys on the North-Western Railway, returnable crates, on the same principle as the non-returnables were designed. For Railway transport their use will probably become general as soon as the rules and rates for returned empties are made uniform on the Indian Railways. The cost of the above non-returnable packages must now be considered. The rates changed by the manufacturers in 1912 were as follows :

1. Peach crates, twenty size, Rs. 15-8-0.
2. Peach crates, fifteen size, Rs. 15-8 0.
3. Material for 3″ cubes, Re. 1-2-0.
4. Material for 3½″ cubes, Re. 1-5-0.
5. Non-returnable crates per dozen, Rs. 5-10-0.
6. Grape boxes, large size, Rs. 15.
7. Climax baskets with covers, large size, Rs. 14-10-0.
8. Two-pound punnets for the non-returnable crates, Rs. 4.

The prices naturally vary a little with the value of wood, but the above represent roughly the cost of these packages, at Glasgow, in 1912. Packing, ocean freight and other charges would, of course, be additional.

The *san* fibre used in the experiments was obtained in pressed bales from dealers in Oudh, and cost Rs. 4 per maund.

THE MARKETING OF FRUIT IN INDIA.

The disposal of the produce :—The present system of disposing of the fruit crop in Baluchistan is not very advanced. The usual method is for the *Malik* to sell the year's crop of any garden to a fruit merchant, for a lump sum, the picking and packing being done by the dealer Some of the produce is sold locally, but the rest of the fruit is sent to India chiefly to agents in the Crawford Market in Bombay. These agents generally regulate the market for their own benefit. Hence some reform is necessary to enable the grower to obtain a fair share of the profits.

The growers and local dealers can be assisted in this business in three ways. In the first place, they should take steps to obtain official statements of the retail prices of the produce, charged to customers, in the large markets in India. The second line of advance would be an efficient method of auctioning fruit at markets as is done in Calcutta and Bombay. The third and perhaps most important way of helping the trade would be to establish agencies in the chief markets, under European supervision, which would be outside any rings made by the Indian dealers.

REFRIGERATION AND COLD STORAGE.

The recent advances in these methods in the United States have drawn attention to the possibility of utilising these devices in India. The conditions of the fruit industry in the United States are, however, quite different from those in India but they may be modified so as to suit Indian condition.

In California, Georgia, and other important centres, fruit is grown to perfection, in vast quantities, and it is possible to fill whole vans —and whole trains—in or near the orchards, and to erect all the cooling plant necessary. In the Eastern States, large cities exist where well-to-do purchasers abound, who do not mind paying high prices for fruit offered in an attractive manner. In India, the conditions are altogether different ; the quality of the fruit at present produced is relatively poor, and the amount is small : the methods of packing are

primitive, and merchants do not exist who are capable of handling the business in a large way; further, there are no markets for fruit in India comparable with those of the United States; the number of Europeans in the plains during the monsoon period falls to a minimum, and they are quite unable to pay high prices for fruit, although they are willing to buy it if it is good and fairly cheap.

A consideration of all the circumstances of the present fruit industry in India discloses the fact that there is no immediate prospect of success for refrigerator cars on the Indian Railways.

IMPROVED RAILWAY FACILITIES.

Speaking generally, the present Railway facilities in India are in advance of the fruit merchants, whose methods of packing are primitive in the extreme. At the same time several Railway reforms relating to rates and regulations are urgently called for One direction in which the Railway Companies can help the fruit trade is in weighing and booking a number of packages together, when sent to one consignee. Another direction of progress relates to the return of empty fruit boxes from the markets to the senders. In this matter the rules on the various railways are exceedingly uneven, and several hampering restrictions exist. The question of the numerous thefts in transit, on the railways remains to be mentioned. These cases are exceedingly numerous and they amount to nothing short of a scandal. The adoption of adequate remedies against theft is a matter that can be dealt with only by the Railway authorities.

CONCLUSIONS.

1. Experience at Pusa and Quetta has shown that the present methods of growing and transporting fruits, in India, are exceedingly primitive, and that far better results in both these directions are easily possible.

2. In the plains, delicate fruit like peaches can be transported without damage, when practically ripe, by means of bamboo baskets containing small cells for each peach.

3. Non-returnable packages, made of wood and ship imported from Glasgow, have been put on the market at Quetta, at prices within the means of Indian fruit dealers By means of these packages delicate fruit like peaches, grapes, and tomatoes can be sent to Calcutta, a distance of 1,750 miles, without loss or damage.

4. At present the ideal system of sending fruit on a large scale, to distant markets, is to adopt a suitable unit gift package, such as a punnet, and to pack these in non-returnable crates. These units should be sold as such direct to the customer.

5. All delicate fruit should be wrapped in paper. The most suitable packing material so far found is *san* fibre, obtained in pressed bales from Oudh.

6. For short distances especially on the North-Western Railway where empties are returned free, there is an opening for returnable fruit packages such as those described in this paper

7. In marketing fruit, it would be an advantage if an arrangement could be made to obtain, daily, the retail prices charged in the Bombay and other large markets. Efficient fruit auctions, at the larger centres, would be an advantage to the grower.

8. At present, in India, the provision of refrigerator cars for fruit on the railways, and cold storage facitilies at the markets, is not likely to pay.

9. The rules for the transport of fruit and empty packages on the Indian Railways are not uniform. Arrangements should be made to grant two concessions to the users of fruit packages of standard size; in the first place the consignments should be charged for on the collective weight and not on the weight of each separate package; in the second place returned empties should be carried free.

10. Thefts in transit should be reduced to a minimum.

Openings for Business.

[For particulars, address the Director-General of Commercial Intelligence, New Imperial Secretariat, 1, Council House Street, Calcutta, mentioning the *Wealth of India*. Firms that may like to follow up any enquiry should give proper references and restrict themselves to those enquiries only which they are fully and seriously qualified to handle.]

TOBACCO.

A Madras firm is desirous of communicating with buyers of tobacco in England, America and Germany. (C49)

KAOLIN AND POTASH FELSPAR.

An official in Kathiawar is desirous of communicating with sellers of kaolin and potash felspar. (C50)

RATANS.

A merchant in Japan is desirous of communicating with exporters of ratan. (C61)

BRAID-MAKING MACHINERY.

A firm in Amritsar is desirous of communicating with makers or suppliers of braid-making machinery. (C62)

RUBY MICA.

A London firm is desirous of communicating with owners of Ruby Mica Mines in Bengal. (C63)

GRAPHITE.

A Bombay firm is desirous of communicating with buyers of graphite or black lead. (C64)

COTTON GOODS.

A firm in Greece is desirous of communicating with Calcutta manufacturers of cotton cloths, drills and khaki. (C65)

LIQUID CARBOLIC ACID.

A Leeds firm is desirous of communicating with buyers of liquid carbolic acid. (C66)

PIG IRON.

A firm in England desires to hear from shippers of Indian pig iron with statement of analyses and purposes of the several qualities and with approximate quotations c.i.f. to usual English ports. (C68)

KAPOK.

A merchant of Antwerp is desirous of communicating with exporters of kapok. (C80)

TANNING MATERIALS.

A firm in Italy is desirous of communicating with Calcutta exporters of tanning materials specially myrobalans. (C81)

WOOLLEN PIECE-GOODS.

A London firm is desirous of appointing agents in Calcutta, Bombay, Madras, Karachi and Rangoon for the sale of woollen piece goods. (C82)

OIL.

A firm in Bordeaux, France, is desirous of appointing an agent for the sale of ground nut table oil in Calcutta. (C83)

LINSEED OIL AND CAKE.

An official of a Native State is desirous of communicating with purchasers of linseed oil and cake. (C84)

LATERITE STONES.

A local firm is desirous of communicating with sellers in or near Calcutta of small laterite stones. (C85)

COCHINEAL GRAIN.

A merchant in Galdar, Canary Island, is desirous of communicating with importers of cochineal grain. (C87)

TINPLATE CUTTINGS.

A Hamburg merchant is desirous of communicating with wholesale shippers of tinplate cuttings. (C88)

TALLOW.

A soap manufacturer in Allahabad is desirous of commumicating with sellers of tallow. (C89)

CEMENT WATER-PROOFER.

A London merchant is desirous of communicating with buyers of a patented cement water-proofer. (C90)

SOAP-STONE.

A Bombay firm is desirons of communicating with sellers of soap-stone able to deliver at Bombay 30 to 50 tons a month. (C91)

COTTON YARNS.

A Smyrna merchant is desirous of representing in Turkey shippers of cotton yarns. (C92)

MICA AND CORUNDUM.

A local firm is desirous of communicating with importers in Europe of mica and corundum. (C93)

The Economic World.

Progress of U. S. A.

We have received the " Statistical Record of the Progress of the United States for the years 1800 to 1912 and the Monetary, Commercial, and Financial Statistics of the Principal Countries," issued by the Department of Commerce and Labour, from Washington. The report contains much useful information and will be of immense help to trade and in understanding the economic progress of the countries concerned. Such publications as these serve as a pulse to registering the commercial tone of a country.

Indian Cotton Duties.

Mr. William Tattersall writes to the *Times*:— In the debate on the Indian Budget no mention seems to have been made of the cotton duties and Excise. Mr. Montagu had nothing to say of them, nor had any representative of the School of Sir Roper Lethbridge a word of protest against the present system. And this at a time of prosperous finance in our dependency. I hold, and have done from the first, that there is no grievance, that the system in operation as to the import duties and Excise is equitable, and that no hardship whatever exists. But it is alleged that in India an increasing volume of feeling against the Excise prevails, which fosters disaffection. This has by no means been proved to me nor, I think, to any one who has given close and unbiassed attention to the subject since the duties were imposed. Still, now is the time for both import and Excise to be abolished. One cannot go without the other. India may make up its mind as to this. They both must go together.

Indian Mineral Production in 1912.

The particulars below are taken from the report of Mr. H. H. Hayden, C.I.E., F.G.S., Director, Geological Survey of India, just published :—

TOTAL VALUE OF PRODUCTION.

The following table shows the values of the production of minerals for which returns are obtainable. It has not been customary hitherto to include in this table such materials as building stones, road metal and clay, since the returns are incomplete. To omit them altogether, however, is even more misleading than to include the returns in their imperfect state and as the value is not inconsiderable, the figures have been added to the table ; they probably represent less than half the actual production of those materials.—

	1912.	Increase	Decrease.
	£	£	£
Coal ...	3,310,365	807,749	...
Gold ...	2,271,806	33,663	...
Petroleum ...	975,278	90,880	...
Manganese-ore (*a*) ...	884,404	235,603	...
Salt (*b*) ...	509,824	40,589	...
Mica (*c*) ...	284,290	95,648	...
Building materials and road metal.	270,980	24,534	...
Saltpetre ...	217,035	...	3,233
Lead-ore and Lead	153,069	...	28,920
Tungsten ore..	115,200	15,211	...
Ruby, Sapphire and Spinel	69,547	1,953	...
Clay ...	66,187	...	20
Iron-ore (*d*) ...	47,044	12,548	...
Tin-ore and Tin	50,944	26,013	...
Monazite ...	41,419	17,375	...
Copper-ore ...	13,709	10,305	...
Silver ...	11,829	254	...
Jadestone (*e*)...	10,800	...	30,860
Magnesite ...	4,614	3,567	...
Chromite ...	3,849	...	1,223
Alum ...	2,627	...	192
Steatite ...	1,429	204	...
Corundum ...	1,295	...	430

(*a*) Value f.o.b. at Indian Ports.
(*b*) Prices without duty.
(*c*) Export values.
(*d*) For provinces other than Bengal, Bihar and Orissa values estimated approximately.

	1913. £	Increase £	Decrease. £
Garnet ...	1,176	...	950
Gypsum ...	1,032	...	1,276
Bauxite ...	516	511	...
Diamond ...	411	...	67
Platinum ...	386	142	...
Amber ...	179	46	...
Ochre ...	161	127	...
Samarskite ...	81	...	8
Graphite ...	*Nil*	...	9,425
Total ...	9,321,486	1,416,922	76,604
		+£1,340,318	

It is highly satisfactory to note the very marked increase in the value of the mineral production of 1912 over that of all preceding years; the figures exceed those for 1911 by over a million and a quarter sterling, corresponding to a rise of nearly 17 per cent. Figures for individual minerals are almost equally satisfactory. There have been increases in the value of the outturn of most of the principal products, such as coal, petroleum, manganese, salt, mica, wolfram, iron ore and monazite, while in thecase of only two minerals lead and jadeite, has there been a considerable decrease in the output of any of the important products; in the case of jadeite the falling-off was due to a reduced demand consequent on recent political disturbances in China.

Why are Our Agriculturists Poor?

We recently invited the readers of our Tamil monthly, the *Practical Life*, in a prize essay competition, to a discussion of the above question. The results of the competition are published in the August issue of the Tamil journal. Mr. Vamana Murty Row of Kurnool, whose essay has been adjudged the best, gives several reasons why the Indian Agriculturist is poor. His views may be briefly summarized thus:—

(1) The Indian Agriculturist is very conservative. He does not resort to the use of improved ploughs; even if he wishes to do so, he has no facilities for getting his costly ploughs repaired if they get damaged.

(2) The cost of keeping cattle for agricultural purposes has gone very high as almost all the waste and other uncultivated lands have been brought under the plough and the forest rules are very stringent. Much fodder is wasted by cattle themselves owing to the careless manner in which they are fed. Mr. Row suggests cutting up the straw and hay into lengths of say one inch or an inch and-a half, thus preventing waste.

(3) Owing to the great difficulty in maintaining cattle, the farmer has to spend much for cattle manure. Further he is prevented from using green leaf manure from forests owing to the stringent forest laws.

(4) The farmer does not take sufficient care to procure good seed.

(5) The use of a greater quantity of seed than is necessary, chiefly in paddy cultivation, reduces the outturn owing to the struggle for existence among the plants. The writer would prefer single planting of paddy to the wasteful method of planting in clusters.

(6) The village accountants and other village officers, being very poor, and unable to live upon the small pay they get, are practically living upon the resources of the agriculturists.

(7) With regard to Land Revenue Settlement Mr. Rao is very emphatic. He says that almost all the lands are yielding very much less than what they did at the time of *Paimash*, and yet the revenue is assessed very high. The increased tax upon land leads to rise in prices and on the basis of increase in prices, the land tax is again raised leading to a further rise in prices. Some may argue that, as prices rule high, the net profit from land, even after paying the increased revenue to the Government, would still be great.

But, Mr. Rao points out that it is not so, except in the case of a few rich landholders, for, as all food stuffs have become dear the farmer, while he gets higher price. for his produce, has to spend away the increased profits in buying his usual necessities which have also increased in price. In fact, he says, the farmer does not get any increased profit from his lands. On the other hand, he has be-

come poorer than before by the amount of the increase in the land tax he has to pay.

Further, agriculturists have much difficulty in finding money to pay their taxes in due time and often have either to sell their produce at very low prices, or get advances on their produce at ruinously high rates of interest from village bankers selling the produce afterwards to the same bankers at very low prices.

(8) The Annual Jamabandi, *i.e.*, the annual settlement is a great hardship to the villagers; every villager having to pay his quota for providing the Jamabandi officers and their followers with all that they may require.

Among the points raised by other writers, the following deserve mention.

(1) The villagers do not know how to preserve farm manure to the best advantage and they do not take special care to provide themselves with good seed.

(2) Absentee landlordism is a great obstacle to agricultural progress. Cultivating one and the same crop while there are many other profitable ones, is another of the reasons given.

Profit-Sharing and Labour Co-Partnership.

A lot of new ideas rule the labour world and Mr. James A. Low, B.A., C.A., propounds two of them in the August number of the *Accountant's Magazine*.

At a time when disputes between Capital and Labour bulk so largely in the public view, all schemes calculated to promote more harmonious relations between employer and employed naturally call forth considerable interest, *e.g.*, Profit sharing and Labour Co-partnership.

Profit-sharing involves an agreement between employer and employed under which the latter receive in addition to their wages a share, fixed beforehand, in the profits of the undertaking. Labour Co-partnership is an extension of profit-sharing enabling the worker to accumulate his share of profit in the capital of the business employing him, thus gaining the rights and responsibilities of a shareholder, and in some cases gaining a direct share in the management.

Of the profit-sharing undertakings, gas-works are at present the most important. The average ratio of the profit-sharing bonus to the wages of the employees participating was 5·5 per cent. for the period of 1901-1911. The profits in which the employees are allowed to participate are the net profits.

The bonus *i.e.*, the employees' share in the profits is usually paid in cash, but in a number of cases it is capitalised by being partly invested in shares of the business and partly placed on deposit with it in the names of the individual employees, such deposits being only allowed to be withdrawn for purposes of a provident character. In other cases the bonus is partly paid in cash and partly carried to a provident fund for the employees. It is only in a few cases that the employees without distinction participate in the bonus. Certain qualifications are usually required before participation is allowed, such as length of past service, or the signing of a contract of service for a stated period. It is interesting to note that Chartered Accountants are often empolyed for the purpose of certifying the amount of bonus payable to the employees. Some firms, which do not give their employees a bonus, are willing to give the thrifty among them a share in the profits by means of profit-sharing deposits or by allotting shares in the business to them. Passing now to the second class of Co-partnership scheme, where the employer is a Co-operative society, we find that, as compared with private firms or public companies, a very much larger proportion of these societies give a share in their profits to their employees. Of the Co-operative stores, approximately one in seven shares the profits with their employees, whilst in the groups of Co-operative manufacturing societies, technically known as Consumer's Productive societies, approximately one in thirteen does so.

There is a further group of co-operative societies known as Productive Associations of Workers, which, unlike the former groups of

societies, are not managed primarily in the interests of the consumers, but of the workers. The industries which predominate in this branch of society are the clothing and textile trades, the printing and allied trades, the food preparation trades, and the metal and engineering trades. In these societies the profits are generally applied (1) in paying a fixed rate of interest (usually 5 per cent.) on the capital, (2) in carrying a sum to reserve fund, (3) in paying a dividend on purchases, and (4) in paying a bonus to the employees, this bonus being wholly or in part capitalised as shares in the society. The bonus averages about 4 per cent. on the wages of those employed. Nearly half of these associations share the profit with their employees, but it is noteworthy that, in spite of the bonus being capitalised, only about 16 per cent. of the membership of these associations is made up of employees, and only about 12 per cent. of the capital is held by them. In spite of their small share in the capital, however, the employees are represented by more than a third of the members of the Committees of Management.

In judging of the results of these schemes, the two most important questions are (1) Does profit-sharing call forth extra zeal amongst the employees ? (2) Does it tend to promote friendly relations between employers and employed, and to prevent industrial dissention? On the first of these questions, there is a great divesity of opinion amongst the employers. As regards the second question, there is a practical concensus of opinion that profit-sharing is of material advantage in increasing the good feeling between employers and employed, and in preventing industrial disputes. Full and detailed information on these subjects is to be found in the excellent report issued by the Board of Trade (Labour Department) in 1912 on Profit-sharing and Labour Co-partnership in the United Kingdom.

Economic Loss to India through Neglect of Science.

Mr. N. P. Gandi, M.A., B.SC., read a paper on the above subject before the Indian Guild of Science and Technology at the Royal College of Science, London. The paper is published in the July number of "*Science and Industry.*" The following is a summary of the same :—

There was a time when India was on a par with, if not ahead of, Europe in industrial matters, *e.g.*, the manufacture of cotton fabrics and indigo and mining. The commercial policy of England when she conquered India was to obtain raw produce from India and to develop manufacturing industry in England. When the Industrial Revolution was transforming England, the Indian manufacturer and artisan did not improve their methods. And there was the difficulty of finding skilled labourers, by those who were willing to adopt better methods.

Many schemes for the introduction of improved methods have failed, because the education of the industrial classes was miserably poor. The first remedy is therefore to establish polytechnics throughout the country and to raise the general tone of technical knowledge.

The rapid development of Indian industries is due to foreigners and to imported capital. Hence no fund of experience is being accumulated in the country, which will enable further progress to be made.

The most encouraging feature of the situation to-day is the fact that both the Government and the educated classes fully recognise the necessity of doing something. The training of Indian students abroad is no doubt good, but it is essential that, side by side, with receiving technical education, they should be constantly on the lookout to study the business management of western industries. Besides this, a complete system of scientific and technical education should be established in India itself, and students must be familiarised with the quality of raw materials and labour supply, etc., available in the country. Advance must also be made towards encouraging a belief in the dignity of manual labour.

There is no lack of raw materials in India but there is no development of them. For

example, there are almost unlimited sources for making our own *salt*, the simplest necessary of life, but every year we import about £400,000 worth of salt for our home use. Our soil is suitable for the growth of sugar-cane, and our vast area can produce an enormous quantity, but in spite of that we import every year *sugar* worth £6,000,000 from abroad, merely because we are unable to produce the commodity economically. India abounds in *iron* mines, but very few know the modern methods of smelting, and our demand is supplied by foreign smelted iron. With even this imported iron we cannot prepare our tools and machines, but buy these ready made from foreigners to the extent of more than £10,000,000 worth every year. We export our *hides* in quite a large quantity, to the value of £10,000,000 in a year; and we import tanned leather, shoes, saddles and other leather articles, although we are one of the world's greatest suppliers of tanning materials. The tarnning material, called myrabolams, is exported to the extent of £300,000 a year, because we do not know how to tan our own hides. Our mines can supply a large variety of *minerals;* and from these, chemicals can be manufactured on a large scale, enough to supply our own needs and to export the surplus. But to-day we are the buyers of foreign chemicals worth £400,000 every year. Almost all *dye*-producing stuffs are found in India, but this once flourishing industry has now died out, chiefly owing to German competition; and now we use about £700,000 worth of foreign stuff in a year. Most of the *glass* materials are lying idle in abundance in many parts of India, and we import glasswares worth about £800,000 every year. India produces plenty of raw material for *paper*-making; even some of this is exported. Yet for our consumption paper mostly comes from abroad. We export a tremendous quantity of cotton, jute, wool, and silk, and in return get manufactured cloth. We export our *oil*-seeds, and import oil.

By exporting the seeds instead of the oil the soil is being constantly denuded of its valuble manure; the cattle, of a very rich and concentrated food. If we start oil mills in India a group of chemical industries will come into existence, and many bye-products will be profitably utilised.

The decadence of the indigenous industries and the replacement of country-made articles by foreign ones is due to the extraordinary strides made by the West in the physical sciences and in their application to industries.

Agriculture is in the same backward position. The average yield of wheat in India is 700lbs. per acre. In England it is 1,700. The average yield of cotton in India is 60-70lb. per acre. In America it is 900lbs. It is evident that there is a very large field for improvement. We neglect manuring and we disregard the principle of the rotation of crops. We have hardly any worth the name of improved tools, implements, and appliances. We exercise very little care in the selection of seeds. Our husbandry is often faulty. Our soil is impoverished of phosphates; and yet the bones of animals, which can supply this deficiency, are exported to the extent of £400,000 a year. If the establishment of chemical industries results in the supply of cheap sulphuric acid, which can turn these bones into cheap manure, a great benefit will be conferred upon our agricultural industry. Difficult as the situation is, success is not impossible, as the achievements of Japan testify. Their success is due to thorough technical education and commercial enterprise.

The time has arrived when the capitalists and merchants of India should co-operate with the scientists, and try their best to revive the decaying industries and start new ones. Risks must be run, manufactures must be started, markets must be built up. Employers must learn the value of the trained men.

We must make up our mind to found institutions for technical education and thereby raise our material condition. No progress is possible in the absence of material prosperity. No moral development, no intellectual achievements, have taken place in countries where the material condition of the people is at a low

level, and where, consequently, life is a mass of pessimism, inertia, and apathy.

"Our salvation depends not so much upon what the Government will do for us, as upon what we are prepared to do ourselves."

The Citizen's Burden.

This is the title of an article which appears as the topic of the month in the June number of the *Financial Review of Reviews.*

The cost of living continues to be a favourite subject for public discussion. So far as the elucidation of the reasons which have led to the increase in the cost of living is concerned, we are not much nearer than we were at the outset. The ponderous reports of the Board of Trade are lacking in completeness and are too belated to be thoroughly satisfactory. A grave shortcoming in them is the failure to give adequate data illustrative of the important part that rates play in the domestic economy of the working-class home. Because of the increased rates, the workman's living all round costs him more.

In the last quarter-century, for which figures are available, the expenditure on Local Government throughout England and Wales has increased by about 150 per cent. It is doubtless the case that a fair proportion of this augmentation of the expenditure is due to the natural expansion of the population. Nevertheless, when every allowance has been made for this factor, there is left an enormous margin to be accounted for.

In the accompanying table, the general position of the United Kingdom as regards local taxation in the past fifteen years is disclosed.

RATES.

	England and Wales.	Scotland.	Ireland.
	£	£	£
1895-6 ...	35,898,042	3,658,063	3,040,558
1899-1900...	40,734,219	4,218,046	2,454,164
1904-5 ...	56,047,715	5,481,989	3,007,627
1909-10 ...	63,260,940	6,614,029	3,300,524

There is no necessity to further emphasise the startling character of the growth of local taxation in the mass.

It may now be interesting to inquire more particularly how the individual is affected by the modern tendencies towards increased expenditure both in the Imperial and Municipal fields. A few typical cases may be given to illustrate the oppressiveness of modern taxation, using that word in its wider sense.

First as regards the common labourer. The man's yearly balance-sheet would thus work out.—

Income.	Public Charges.			
£ s. d.		£	s.	d.
62 8 0				
	Rates	6	10	0
	Beer duty	4	0	0
	Tobacco duty	1	1	0
	Tea duty	0	10	10
	Sugar duty	0	2	6
	Miscellaneous	0	1	0
	Insurance	0	17	4
	Total ..	£13	2	8

Should the man be eligible for unemployed benefits a further 13*s.* must be added. Altogether, it will be seen, not far short of a fourth of the man's income goes in discharge of his liabilities to public authorities. If allowance is made for holidays and periods of unemployment the proportion will be quite one-fourth.

The balance-sheet of a higher grade of worker would be as follows:—

Income.	Public Charges.			
£		£	s.	d.
104				
	Rates (at 3*s.* 6*d.* weekly)	8	2	0
	Beer duty	4	0	0
	Spirits (1 gallon) ...	0	11	6
	Tobacco duty ...	1	1	0
	Tea duty ($\frac{3}{4}$lb. weekly)...	0	16	3
	Sugar duty	0	3	9
	Miscellaneous ...	0	1	6
	Insurance	0	17	4
	Total ...	£15	13	4

Here instead of a quarter of the total income going to pay rates and taxes we have just upon one-seventh.

This "aristocrat of labour" is about the most favoured being in the state in the matter of taxation. The figures that have been given relate to persons resident in the metropolis. In provincial towns the amount to be put in the account for rates would be less, the reduction ranging from 40 to 50 per cent. But in

all other respects, the account would stand.

The balance-sheet of the tradesman or city clerk passing rich on £300 a year would be somewhat on these lines.—

Income. £		Public Charges £	s.	d.
300	Rates	13	0	0
	Spirit duty (9 gals.) ...	5	3	6
	Income-tax (at 9*d.* in the £, with an allowance for two children under 16)	4	10	0
	Tobacco duty ...	1	11	6
	Tea duty (1½lb. weekly)	1	12	6
	Sugar duty	0	5	0
	Miscellaneous ...	0	3	0
	Insurance (one servant)	0	13	0
	Inhabited house duty ...	0	10	0
	Total ...	£27	8	6

If the income was derived from investments entirely the income-tax would be at the higher rate of 1*s.* in the £1, and £1 5*s.* would have to be added to the total.

The balance-sheet of a person earning £500 per annum will be as follows :—

Income. £		Public Charges. £	s.	d.
500	Rates (on a house rented at £60 per annum)	20	0	0
	Spirit and wine duties ..	10	0	0
	Income-tax (at 9*d.* per £, with an allowance for two children) ...	18	0	0
	Tobacco and cigar duty	2	10	0
	Sugar duty	0	10	0
	Miscellaneous ...	0	6	0
	Insurance (2 servants)...	1	6	0
	Inhabited house duty ...	1	10	0
	Total ...	£54	2	0

In cases where the income is derived solely from investments and addition of £6 would have to be made to the total. Individuals so situated, therefore, pay away one-ninth of their total income in taxation of one kind and another. A quarter-century ago the liability would have been little more than half what it is to-day.

From these facts and figures it is clear that the increasing burden of taxation, Imperial and Local, falls with exceptional severity upon the poorer working-class and the lower middle class The class which has largely escaped is the highly paid artisan. Whatever may be the view held as to the incidence of increased taxation from a sectional standpoint, there can hardly be a question that the general influence of the immense additions to public burdens in recent years on the country's interests is mischievous. There is a striking indication of economic weakness in the highly remarkable emigration returns of the past few years. The total has grown from 146,460 in 1897 to 454,527 in 1911. Making allowance for other causes, one thing which seems to be certain is that the burden of existence in the United Kingdom for a very large class of workers has become insupportable and that they are turning their faces elsewhere with a determination which is born of other influences than the enticements of the emigration agent.

"The pressing need for retrenchment in expenditure of all kinds has yet to be recognised by those who profess to lead public opinion. But the movement will come, and probably at no distant date. Meanwhile, good service might be done in at least one direction by persistent advocacy of the demand which has often been made for the abolition of the system of compounding for rates. At present the working classes are usually on the side of those who are in favour of adding to public expenditure in local administration, because they do not understand that every addition made to the rates increases their burdens. If they paid their rates directly instead of in the shape of a rent charge they would be as keen economists as any and a salutary check would be put upon extravagance. In the sphere of Imperial taxation it would be more difficult to devise means by which the truth could be enforced that the workers' interests suffer by high taxation. Direct taxation in some form would do it, and with the experience of the Insurance payments, which are in all but name an income-tax, we need not despair of some day seeing a new

direct impost substituted possibly for some of the forms of indirect taxation which are now in operation. Meanwhile, it is permissible to hope that wider acquaintance with the disastrous consequences of lavish public expenditure will of itself bring about a beneficent revolution in the popular attitude towards the policy which in the last two or three decades has been in the ascendant in the domain of both Imperial and local administration."

The Value of Birth as a National Asset.

Mr. James Stanley Little contributes an article on the above subject to the August number of the *Empire Review*.

At the meeting of the Eugenics Congress held some time ago, Dr. F. A. Woods, of the Harward Medical School, somewhat amused and startled his audience in claiming that the number of men of genius among royalties was a hundred thousand times as many as among all other classes of society. Out of 832 monarchs he claimed to have found by analysis that about 40 could fairly rank with any man of genius. At the same meeting another speaker declared that having analysed the intellectual status of certain members of the House of Lords, whom he divided into two groups, a group of eminent and a group of able men, he arrived at the fact that each of the eminent men had five able relatives ; whereas eminent men of the middle classes showed an average of one able relative each. The explanation advanced was that there is more selective mating in the ranks of the aristocracy than in those of the middle classes.

So far as dynasties are concerned, the unbiassed student of history must be forced to admit that Dr. Woods's thesis is incontestable, though he may attribute the phenomenon itself to opportunity. As touching the transmission of virile qualities in noble houses, the evidence is overwhelming and conclusive. There is nothing extraordinary about this. To-day every one accepts Darwin's teaching ; and his one time theory of evolution is now an acknowledged and basic scientific fact.

In the past, however rough and ready the processes, nature seemed to have determined that, come what might, the higher types of humanity should be produced in sufficient numbers to enable them to lead, rule and control the lower types. To-day the most robust optimism can scarcely pretend that this hitherto prevailing law continues to operate. Dr. Hubbard in his 'The Fate of Empires,' looks to disaster and ruin as the ultimate and indeed the proximate result of the weakening of family, as an institution, in European countries. The decay of family life is an undeniable fact.

The remedy must lie in a determination on the part of the folk who know that the qualities they possess, differentiating them from the common herd, have had their origin in the cumulative efforts of a long line of purposeful ancestors, to be true to their ancestry, and being so, to be true to their posterity.

Then we shall see the beginning of a salutary change. These better elements must close up their ranks resolutely ; living their own lives and pursuing their own ideals ; unmindful of the ways and ideals which are now those of the bulk of the people. Above all they must determine to have done with the suicidal selfishness of restricting their families, since if this restriction is to endure the present downward tendency must continue and become permanent, and the better elements of society suffer obliteration and extinction.

Should the policy indicated be observed, a day will dawn when the natural rulers of the country will come by their own again. In times of stress the nation will call to its aid its best ; or to be more precise, its best will rise by the inevitableness of the necessity to take the lead.

A period of acute suffering and self-abnegation will have to be faced. This and probably the next generation must reap the whirl wind sown by careless predecessors. But one must remember that everything accomplished for the good of humanity in the past has been accomplished by men and women who were not merely ancestor-worshippers, but posterity-worshippers.

The Financial World.

The Interim Report of the Royal Commission.

The interim report of the Royal Commission on Indian Currency and Finance has just been published. We hope to give a summary of the evidence of the important witnesses in the next issue.

Rural Credits.

America is a go-ahead country in several ways and the following bill to establish a system of rural banks, for the purpose of furnishing long-term loans to farmers on agricultural securities, introduced by Senator Duncan Fletcher of Florida into the Senate of the U. S. A. will be read with much interest. The bill proposes :—

(1) A system of local national rural banks owned and operated by farmers ;

(2) A rural national bank in each state, to be owned and controlled by the local banks as stockholders ;

(3) A national rural bank of the United States, to be located in Washington, to be owned entirely by the State rural banks ;

(4) To supervise this proposed chain of banks by creating in the Treasury Department a Division of Rural Banking under the direction of a " Rural Banking Board," to consist of the Secretaries of the Treasury, Agriculture and Labor, this division to be under the immediate direction of a " Director of Rural Banking " chosen by the President.

The Investor's India Year Book, 1913.

The first edition of this book was published in 1911 by Mr. G. H. Le Maistre, Deputy Secretary to the Government of India in the P.W.D. Though intended as a *year* book, no edition of it came out in 1912 as it was found " impossible for various reasons to issue a revised edition."

Messrs. Place, Siddons and Gough, the leading stock and share-brokers of Calcutta having now taken over the publication, we may rest assured it will appear regularly in future.

An annual of this sort brought up to date is a great desideratum in India at present. The country is undergrowing rapid transformation in respect of its industrial and commercial activity and as all business nowadays means the employment of capital associated on a large scale, a book describing the various classes of investments in India and giving reliable and authentic information in regard to all public institutions and joint stock companies is bound to be of great benefit to all investors in India. The previous edition dealt with Railways, Banks, Jute, Tea, coal and Miscellaneous Companies of the aggregate face value of Rs. 36·40 crores. An important section on Cotton has now been added, written by that well-known authority on the cotton mill industry, Mr. D. E. Wacha. Each section in the book gives the latest information available as to the future prospects of the various industries dealt with and attention is drawn to the main factors that should guide an investor in making a selection for investment. The analysis given of the past working of each concern for a period of ten years is a valuable feature which should prove of great benefit to the investor before he risks his money. The Investor's year book is a valuable work of reference and is sure to be eagerly sought after alike by the investor, the shareholder and the student of economics in India. The book may be had of Messrs. Place, Siddons and Gough, Commercial Buildings, Calcutta, Price Rs. 5.

The Tooth of Usury.

The borrower of money will never, perhaps, become an extinct factor in the social fabric. A thorough eradication of the evil may be impossible ; but a mitigation of its ' horrors ' can be hoped for. The London *Times* draws an excruciating picture of the wily tricks employ-

ed by usurers to trap the imprudent and the unwary.

The circulars of these usurers, says the *Times*, have attained a form of classic brevity, are confidential, even caressing, in tone. "Should you at any time require an advance"—and who does not?—a gentleman, who hides his Eastern origin behind a noble Plantagenet name, is ready to oblige you" "Any sum from £100 up to £10,000 if desired can be had at short periods for the moderate charge of £5 for £100 advanced." You will notice the cunning with which the extortionate interest is veiled. "The charge of £5 for each £100 advanced is moderate indeed, if it be taken to mean, as it should mean, an annual charge. But it is not of 5 per cent. per annum that the money-lender dreams; it is of 5 per cent. a month, a week or even a day."

Like the moth that seeks its own grave, the borrower, in the words of the same journal, walks with a bold front into the money-lender's office, full of faith and hope, signs whatever documents are presented to him, and goes home with a cheque in his pocket. So far all has gone well. But if he falls behind in his payment, he is confronted with a Shylock resolute to extract from his victim the last ounce of flesh.

Clerks doing their best to keep up a respectable appearance on a small salary, are his easy victims, from whom he can extort whatever he will by the mere threat of revealing their loans to their masters.

Bacon wrote of usury that "It makes fewer merchants; for the usurer, did he not pursue this lazy trade, would employ his money in commerce. It makes poor merchants, for "the merchant cannot drive his trades so well, if he sit at great usury." Worst of all, says the *Times*, it brings the wealth of a country into few hands, as has been proved, to the people's undoing in Ireland and in India. As money-lending there must be, the state will do well if it see to it "that the tooth of usury be grinded, that it bite not too much."

The Pleasurable Practice of Investment.

Mr. T. C. Elder contributes an article on the above subject to a recent number of the *Financial Review of Reviews*.

The really paying hobby of the study of investment numbers apparently very few enthusiastic amateurs indeed. But the science of investment deserves to be popular for the sake of the real and continuous fascination that lies in the cultivation of capital.

"The intelligent saver of money and discriminating investor gets at least as much gladness out of the great game of life as the thoughtless spender, and his absorption in capital development is by no means purely concerned with the attainment of sums total. He is above the week-to-week living-earner because apart from his daily bread and butter he has a finger in the world's business. He belongs to the great society of investors. He is one of our rulers. For whatever democrats may say or democracy may do, it is the keepers of capital who must always have the last word on questions of permanent Government policy."

With quite a negligible number of exceptions, the tendency of wealth is to gravitate towards those who know best how to use it, not those who appear to be most obviously in need of it. Therefore the best way to qualify for larger possessions is to learn the right use of money. But few people take any such trouble or are even attracted by the promise of such a science. Only a minority of newspaper readers pay any attention to the daily and hourly vibrations of the monetary millions reported in newspapers.

And it can scarcely be otherwise when of the thousands of young men turned out from school and college, few have ever heard or read a single word about the practical principles of investment.

No education can be called practical which does not prepare the young for an early understanding of the ways and means of life, and before they take their various turnings into professions and businesses they should at least be instructed in the generalities of trade and finance. They should learn how money ought to be used, and there is nothing but good in

inspiring them with some desire to wield the power of thrifty investment.

For the grown-ups who are already in possession of funds great or small, and who are now alternately over-anxious or unreasonably elated as their unskilfully chosen securities hoist periodically the signals of distress or triumph, there is now a series of volumes published easy to read and to remember. No excuse therefore exists now for the blindness of any investor Many who have large possessions should reconsider their habits of negligence.

The means are already in existence for the pleasant practical education of investors, and all who respond to the suggestion that they should better equip themselves for protecting their capital may be assured of both mental and financial profit, while at the same time contributing substantially to the public benefit ; for one of the best things that can happen to any country is the multiplication of capitalists who know their business, who eschew the violent delights and disasters of share gambling and whose constant aim has the effect of guaranteeing that saved money does its true work in the continuous nourishment of industrial and social progress.

Council Bills.

In view of the fact that the sale of Council Bills is one of the subjects referred to the Royal Commission for report, we give below the rules in force, dated 2nd June 1906, as to the method of selling Bills and Telegraphic Transfers on India by the Secretary of State.

Sale of Bills.

1. The Secretary of State for India in Council is prepared to allot on Wednesday in each week Bills of Exchange on the Government of India, the Government of Madras, or the Government of Bombay, of an aggregate amount not exceeding that announced in a notice which will be previously exhibited at the Bank of England.

2. Tenders for such Bills will be opened at the Bank of England on each Wednesday at 1 o'clock.

3. Tenders must be made on forms which can be obtained on application at the Chief Cashier's Office at the Bank of England. They must be delivered, under cover, at the said office.

4. Any tender may be for the whole amount shown in the announcement or for any portion thereof not being less than Rs. 10,000. The amount of the tender or tenders submitted by or on behalf of any one person, firm, or company must not in the aggregate exceed the amount shown in the announcement. Tenders which appear to the Secretary of State in Council to be submitted in direct or indirect infringement of this rule will be rejected.

5. Each tender must state the rate of exchange at which the applicant is prepared to purchase a Biil or Bills of the amount for which he tenders, or any less amount that may be allotted to him. The rate of exchange must be expressed in pence, or in pence and a fraction of a penny per rupee; any fraction that is used must be either one thirty-second of a penny or a multiple of one thirty-second of a penny.

6. In the event of two or more tenders being made at the same rate, and the amount to be allotted being less than the amount of both or all, a *pro-rata* allotment will ordinarily be made, subject to the condition that no Bill will be granted for a less amount than Rs. 5,000.

7. As soon as practicable after the opening of the tenders the result will be made known at the Bank, and the *Maximum* amount to be allotted on the following Wednesday will ordinarily be announced at the same time.

8. On Wednesday afternoon persons who have tendered will, on application at the Chief Cashier's Office, be informed whether any allotment has been made to them.

9. Payments for Bills allotted on a Wednesday must be made on or before the following Tuesday.

10. Those applicants to whom an allotment of Bills has been made will be furnished with a form to be filled up with the particulars of the Bills desired, which must be left at the Chief Cashier's Office before 12 o'clock on the

day preceding that on which the Bills are required; the Bills will be delivered next day on payment in cash not later than 2 o'clock.

11. In addition to the tenders mentioned above for Bills to be allotted on Wednesdays at 1 o'clock, applications may be made on an Wednesday after the result of the allotment has been announced (but not later than 3 o'clock), on Saturday between 11 and 12-30 and on any other day between 11 and 3, at the Chief Cashier's Office of the Bank of England for intermediate Bills drawn on the Government of India, the Government of Madras, or the Government of Bombay. No pledge can be given that such applications will be complied with; but, if intermediate Bills are granted, the following condition will be ob-observed, viz, that if, at the preceding allotment, Bills have been allotted to the full amount previously announced, intermediate Bills will only be granted at rates exceeding by at least one-thirty-second of a penny per rupee, the minimum price at which an allotment was made. If, however, the minimum price has exceeded 1*s*. 4-3/32*d*. the rupee, the condition will not be enforced, as the Secretary of State in Council is prepared to sell until further notice intermediate Bills at 1s. 4⅛*d*. the rupee.

12. If an intermediate Bill is granted on a Tuesday, payment must be made on the same day: if a Bill is granted on any day other then Tuesday, payment must be made not later than the following Tuesday.

SALE OF TELEGRAPHIC TRANSFERS.

13. Applications for Telegraphic Transfers on the Government of India, the Government of Madras, and the Government of Bombay, will be received on behalf of the Secretary of State for India in Council at the Chief Cashier's Office at any time between 11 and 3, except on Saturdays, when the hours are from 11 to 12-30. Those which are received on Wednesday before 1 o'clock will be opened at the same time as the tender for the weekly allotments of Bills; and, if transfers are then granted, the fact will be announced at the same time and in the same manner as the allotment of Bills. Transfers will be granted only in thousands of rupees, and in no case for less than one lakh. Applicants tendering on Wednesday before 1 o'clock both for Bills and transfers, may, if they wish it, insert in their tender for transfers a request that, if that tender be not sufficiently large to secure an allotment of one lakh of rupees, it may be increased to the necessary extent by reduction of their tender for Bills.

14. If a transfer is granted on a Tuesday, payment must be made on the same day; if a transfer is granted on any day other than Tuesday, payment must be made not latter than the following Tuesday.

15. The necessary telegram to enable the amount of a transfer to be issued to the recipient in India will be despatched on the day on which payment for the transfer is made at the Bank of England.

GENERAL.

16. The sales of Bills and Telegraphic Transfers, and the rates at which they have been made, will be from time to time announced at the Bank of England, and the total amount sold up to date since the 1st of April, with the sterling realised, will be similarly announced on each Wednesday morning at 11 o'clock.

17. The Secretary of State in Council, while making the foregoing announcement as regards the practice to be ordinarily pursued, reserves to himself the right of rejecting the whole or any part of any tender and of departing in any respect without previous notice from the terms of this announcement, should circumstances render it expedient.

Reform of Indian Currency.

Mr. M. De. P. Webb, C.I.E., the well-known financial expert of Western India has sent round to the Press an article on the above subject. India, being one of the largest, richest, and most powerful Division of the British Empire, merits, in every department of her activities, the best equipment that human experience is able to give her. And this best equipment

includes, of necessity, the best monetary system and the best monetary tools. There is not the slighest necessity for India to make further currency experiments of her own, or for her to hesitate for one second before advancing to the same monetary standard as that of England and the rest of the civilised world.

The first thing for India to do is to secure the restoration of *The Right of Free Coinage* of which she was temporarily deprived in 1893, The Government of India, on the recommendation of the Indian Currency Committee of 1898 attempted to restore this right to India in 1899-1902, but eventually abandoned the effort in face of the united opposition of the British Treasury and the London Mint Authorities. In consequence of this unfortunate abandonment of the cardinal feature of our currency system, India's currency and finances have for years been the plaything of irresponsible officials and bankers in London. Budgets have been treated as waste-paper, monetary principles cast to the winds,and Indian's balances and reserves shuttle-cocked here and there as the recommendations of this banker or the idiosyncracies of that official for the moment ditated. India's interests often appear to have been the last thing that mattered. Some of the consequences have been that the India Office, by its weekly (and often wholly unnecessary) sales of rupees at prices which it itself manipulated, has affected

(*a*) imports of gold or silver into India ;

(*b*) the sterling value of the rupee ;

(*c*) the rates of discount in India; and

(*d*) the general level of prices in India.

Happily the Government of India last year again took up the question of an open, free, Gold Mint for India; and though there are indications that London influences are once more creating paper obstacles, there is now every reason to hope that India will this time receive fair play, and that the Supreme Government will shortly raise this great division of the British Empire above the level of Persia, Mexico, and China so far as the central feature of its currency system is concerned.

Fortunately the moment is ripe for India's advance. There is plenty of gold available and if, by India's withdrawal and use of a portion of the golden steam, the rapidity of the rise in prices now in progress is in some degree checked, the result will be only simple justice to the scores of millions of small fixed wage earners in India and elsewhere, to whom a rise in the price of food means partial starvation.

Modern money being in its essence merely a certificate of service performed, the day may possibly come when such certificates will be recorded on paper instead of on gold and silver, &c., and the precious metals be done away with altogether for monetary purposes. Indeed such certificates might be issued by Government in payment for services performed in the building of all permanent public works like canals, roads, bridges, railways, telegraphs, and so, in this way, public interest-bearing loans could be avoided. The issue of State Paper Money might even be so regulated as to prevent the injustices that at present flow from general movements of prices—upwards or downwards. There seems no reason why State money (secured by national public works and *not by gold or silver*), should not some day become international. In fact, there is no limit to the developments that are conceivable,—when the millenium arrives. Many theorists, college professors, and hard-headed men of business have worked out in great detail the various intermediate stages of development. But, observes Mr. Webb, "until Great Britain, Europe, and America have moved another step forward, and have perfected the next stage of currency development to the satisfaction of all concerned, it would obviously be a mere waste of time to attempt experiments in India where we are still behind the monetary systems in operation in the West.

Mr. Webb concludes :—Let us first try and move forward to the level of Great Britain's monetary standards. Let India advance and take up her position, so far as her currency is concerned, shoulder to shoulder with Great

Britain, with the other great divisions of the British Empire, and with the rest of the civilised world,—her chief metallic, monetary tools fashioned of gold, and her main source of supply, *not* somebody else's manufactory on the other side of the world, but her own open, free, Gold Mint. Thus equipped, India will not only be a source of financial strength to the Empire at large, but she will be able to hold her own, in monetary matters with any nation in the world.

Gold Absorption in India.

The following information regarding the demand for gold in India is taken from a contribution to a recent issue of the *Statist*.

AMOUNT ABSORBED.

	£
Approximate amount absorbed through Government Treasuries and Currency offices to the end of the year 1911-12 ...	40,310,000
Approximate amount absorbed from April to December 1912. ...	7,429,000
	47,739,000

LOCATION.

Sovereigns and Half-Sovereigns held at nominal value.

CURRENCY RESERVE.

	£
Currency Office, Bombay ...	15,243,768·0
Do. Karachi	93.666·0
Calcutta Mint on behalf of the Currency Dept. (light weight) ...	6,870·5
Currency Office, Calcutta ...	1,902,851 0
Do. Madras ...	103,071·0
Do. Lahore ...	401,651·0
Do. Cawnpore ...	1,109,058·0
Do. Rangoon ...	935,009·0
Total Currency Reserve	£17,795,944·5

TREASURY AND OTHER BALANCES.

Reserve Treasuries, Calcutta, Madras and Bombay ...	15,162 0
Other Treasuries ...	354,332·0
Bombay Mint (light weight) ...	32,110·0
Calcutta Mint, below current weight	116·0
Total Treasury and other Balances ...	£401,720·0
Gold Standard Reserve	Nil.
Grand total	£18,197,664·5

Approximate amount of sovereigns absorbed up to December 31, 1912.

	£
Total Tenders to Govt. by Importers since Jan. 1, 1900 ..	86,137,000
Total Imports not tendered to Govt. since Jan. 1, 1900 ...	13,455,000
	...99,592,000
Registered Exports since ...	23,512,000
Net Imports	£76,080,000
Net addition to the amount of sovereigns held by the Govt. of India and Presidency Banks since Jan. 1, 1900—	
Opening Balance ...	3,356,000
Closing Balance ...	18,242,000
ABSORPTION BY THE PUBLIC—	
Direct absorption ...	13,455,000
Absorption after passing through Govt. Treasuries	47,739,000
	£61,194,000

According to Government estimates, net imports since January 1, 1900, amount to £76,080,000 (or say Rs. 1,14,12,00,000), of which it is calculated that £61,194,000, has been absorbed by the public, whilst the net addition to the amount of sovereigns held by the Government of India and the Presidency banks is only £14,886,000. The following figures show in tabular form the rupee values of gold imports from 1885 onwards:—

Value (in Rupees) of Gold, imported into and exported from British India from and to Foreign Ports.

	Imported.	Exported.	Net Imports.
From 1885-1895—	34,65,56,270	18,38,94,750	16,26,61,520
From 1895-1905—	1,12,44,82,895	55,59,69,153	56,85,13,742

The figures from 1905 onwards show an even greater relative increase in net imports, and are given below in detail up to the end of the financial year of 1911:—

	Imported.	Exported.	Net Imports,
1905-06 ...	14,74,89,722	14,29,09,836	45,79,886
1906-07 ...	18,53,33,819	3,67,73,424	14,85,60,395
1907-08 ...	20,75,26,407	3,38,49,127	17,36,77,280
1908-09 ..	8,40,42.310	4,04,87,653	4,35,54,657
1909-10 ...	25,03,10,218	3,35,15,110	21,67,95,108
1910-11 ..	27,89,09,767	3,91.53,969	23,97,55,798
Total ...	1,15,36,12,243	32,66,89,119	82,69,23,124

Detailed statistics of net imports from 1910-11 onwards are not published, but it is known that the huge total of Rs. 23,97,00,000 (or nearly 16 millions sterling) reached in 1911 has since been largely surpassed. Last year alone India took 25 millions sterling in sovereigns in bars, and it is estimated that the gross demand will reach 30 millions sterling, or even more, during the present year. This largely increased demand, as the foregoing figures show, is of comparatively recent origin, and the subject will doubtless engage the attention of the Royal Commission on Indian Finance and currency in due course.

Banking in India.

The following letter addressed by Mr. J. F Gruning, I.C.S., Offg. Secretary to the Government of India, Department of Commerce and Industry, to all Local Governments and Administrations, on the 22nd August, 1913, is published :—

I am directed to address you as to the desirability of legislation in connection with the use of the term 'bank' in this country. I am at the outset to explain that it is not at present the intention of the Government of India to attempt to control the numerous forms of banking operations known under various names, which are carried on in this country in business centres either by foreign or indigenous agency. Similarly, the Government of India do not propose to include in the scope of such legislation the regulation of a form of banking undertaken by industrial companies which receive deposits from certain persons during their busy season in order to finance the business of the firm. The Government of India wish only to examine, for the present, the desirability of attempting to impose restrictions on the use of the term 'bank,' or 'bankers,' or its equivalent, such as 'banking agents,' 'banking societies,' etc., by individuals, partnerships or companies who conduct banking business on lines which are unsound and likely to imperil the security of credit. I am particularly to invite attention to the fact that deposits in banks for which statistics are available are increasing very rapidly. Between the years 1906 and 1911, the increase was from 12 to 25 crores of rupees, and the movement continues to progress. According to the latest statistics available, there are 451 banking and loan companies registered under the Indian Companies' Act. The Government of India have no information regarding the number of individuals or partnerships engaged in the business of banking under the name of 'bankers' in the Province of . . . . They desire, therefore, to be furnished with such information on this point as can be readily procured. They are under the impression that a considerable number of banks exists which have not been registered under the Indian Companies' Act. Such institutions, I am to observe, cannot be affected by the improved regulation of the conduct of public companies which may be expected to result from the recently enacted Indian Companies' Act of 1913 taking effect in 1914.

THE TITLE "BANK."

2. I am to offer certain general remarks regarding the points in which many existing banks appear to require reform, if they are to continue to receive large deposits from the public. In the first place, it is for consideration whether the term 'bank,' 'bankers,' etc., should not in future be restricted to companies registered under the Indian Companies' Act. In the absence of any legislation regulating the use of the term 'bank,' it is open to individuals and firms to take advantage of the undoubted prestige which the term conveys, and to receive very large sums of money from the public without even coming under the restrictions which regulate the conduct of public and private companies. They are not required to publish accounts, or to notify their capital or the dividends paid, or to take any precautions for the proper control of the bank's business such as are enforced on a company conducting banking business by the Indian Companies' Law. There is a special danger in this state of affairs. The Indian public are, it is believed, slowly learning to substitute bank deposits bearing interest for the time

honoured practice of hoarding. The movement properly regulated is a normal and healthy one which adds very greatly to the resources of the country by utilising the credit of which capital, when not hoarded, forms the basis. It is of the utmost importance to the country that this process should continue unchecked by any serious set back such as the failure of any considerable number of banking institutions would undoubtedly entail. The use of the term 'bank' indiscriminately by individuals and firms prejudices the stability of the whole system of banking, including banking of public companies, and discredit would fall on all alike in the event of serious failure of banks controlled by individuals or by partnerships. For this reason it would appear desirable that, at least for the future, the term 'bank,' 'banker' etc., should not be allowed to be used except by registered companies. With reference to banks already in existence, it would appear *prima facie* undesirable that any exemption of existing banks should be made from this restriction. The recent history of private banks in India has not indeed been so devoid of failure as to eslablish a strong case for such an exemption. But the Government of India would be prepared to consider whether the case might not be met by permitting such existing banks to continue business on their undertaking the regular publication at six monthly intervals of balance sheets audited by a person competent to audit under the provisions of section 144 of the Indian Companies' Act. I am particularly to lay stress on the fact that the withdrawal of the right to use the term 'bankers' or 'banking agents' from such persons or partnership as so describe themselves does not inflict any real hardship on these existing institutions. For it is to be observed that this restriction does not involve any discontinuance of the business in question, but only a substitution of the term 'bank' or 'bankers' by soms other less imposing titles, as, for instance, 'financial agents,' 'loan companies,' etc.

SUGGESTED RESTRICTIONS.

3. It would follow from these suggestions, if they prove capable of adoption, that institutions which will hereafter possess the name and prestige of 'banks' should be subject to certain restrictions. Such restrictions would appear to be especially desirable in regard to the following matters:—

(1) The prescription of a minimum amount of subscribed capital.

(2) A stipulation that an adequate portion of such capital should be duly paid up within a reasonable period from the starting of the business.

(3) A restriction on the full allocation of profits to dividends pending the building up of an adequate reserve.

(4) A restriction as to taking up by a 'bank' of business outside that of banking in which the banking profits might be lost.

4. Before, however, proceeding further in the consideration of such a policy as that outlined above, the Government of India would be glad of the opinions and suggestions of Local Governments, Chambers of Commerce, etc. I am, therefore, to request that after consulting Chambers of Commerce and such other persons or local bodies as you may think advisable, you will favour the Government of India, at an early date, with your views on the subject, and especially as regards the scope and direction which such general restrictions as those mentioned above, should they be thought necessary, can best be specially applied.

5. The Government of India, of course, recognise the desirability of not interfering with really legitimate banking business, and the matter is consequently in a very special degree one in which they would be materially assisted by learning the views of the commercial community.

The Educational World.

A Chair of Sericulture.

A Chair of Sericulture has been created in the Scientific Department of the University of Lyon, France, as a part of the general instruction in applied Zoology. Funds for the payment of a Professor and an Assistant have been raised by the Local Chamber of Commerce, as one means toward maintaining the supremacy of Lyon in the Silk Industries of Europe.

Fresh Air and Infection.

Dr. Sadler's report on the Elementry Schools of Guernsey has been issued. What he says about ventilation would apply to a large number of schools throughout the country. " If I may touch on a rather delicate subject," he says, " I would venture to ask the attention of teachers to the importance of keeping the windows open in school rooms during lessons, as well as of securing a strong draught of air through the rooms at each time of recess . . . This practice of keeping the windows open (when the first inconveniences of it have been overcome has a marked effect upon the health of the school and lessens the risk of the spread of infectious disease among the children. The beneficial effects upon the teachers' health are also noticeable."

Agricultural Education.

Though Agricultural Colleges have been established in all parts of India, they are generally resorted to by aspirants after Government service who take to the colleges for obtaining a sort of passport for entrance into the Agricultural Department. As the Director of Agriculture in the Central Provinces observes, the Agricultural castes do not take readily to any form of higher education. What is wanted, says the *Indian Spectator*, is the organisation of small rural schools where instruction of a practical character bearing mainly on agricultural subjects may be imparted in the vernaculars by Indian Graduates, who may themselves have passed through an Agricultural training. Not that these Agricultural Colleges are to be condemned as valueless; they have their place, and a proper place, in agricultural education. If they only serve to bring out a number of graduates who can devote themselves to the work of giving the benefits of their knowledge to the mass of the cultivating population, bringing home to the latter the need for improvement in methods of work and in the use of implements, the Agricultural Colleges will have vindicated for themselves a right to existence and to the largest Government support.

Pictorial Tuition to Workmen.

A scientific crusade is being waged by an enterprising firm in the United States by means of motion-pictures which are taken of mechanics at work, for the purpose of eliminating useless time-consuming movements on the part of the worker, and also to discover whether the right man is in the right place. The films when developed and thrown on a screen depict every motion of the workman engaged in such an operation as that of constructing and assembling a particular machine. Pictures showing useless motions are cut out of the film and later out of the workman's operations. The pictures may then be used to instruct an unskilled workman. The new man learns almost at a glance what it has taken the skilled workman years to acquire.

Education of Factory Children.

In accordance with the communication received from the Government of India with regard to the education of factory children, the Hon'ble Dr. Bourne reported to the Madras Government that although there were, according to the latest published reports, 201 factories in this Province with an average daily attendance of 4,725 children, very few do anything for the children they employ. It was said that the Bucking

bam and the Carnatic Mills in Madras make adequate provision towards educating their children and that on the 31st March last, their schools had on their rolls respectively 277 and 274 pupils and received a grant-in-aid of Rs. 733 and Rs. 658. It was also said that the children employed at Chittivalasa Factory attend a Mission School and the manager of the Cotton Mill at Gonahal employs a teacher. The Hon'ble Dr. Bourne therefore proposed to start half-time schools at places where there are factories employing a considerable number of children and where managers promise to secure the attendance of the children. The following are the mills selected:—(1) The Kistna Jute and cotton mill, Ellore, which employs 60 boys and 20 girls; (2) Spinning and Weaving Mills, Coimbatore, where there are 234 boys and 176 girls; (3) Kaleswara Mills, Ltd.,Coimbatore; 42 children; (4) Madura Mills, Ltd.,Madura, which has 500 children, and (5) Coral Mills, Tuticorin, which employs 100 children. The total annual cost estimated for each is respectively as follows :—(1) Rs. 336 ; (2) Rs. 1,140 ; (3) Rs. 192 ; (4) Rs. 1,500 ; and (5) Rs. 336. The schools will be at first under the control of the respective Municipalities, but later on will be handed to the mills themselves. The Government of Madras have approved the proposal.

The Science of Rural Administration.

The Berlin Agricultural College has organized for the present summer term, a special course of instruction in the science of rural Administration in order to supply the necessary information on this subject to persons intending to qualify for entrance into the service of the Chambers of Agriculture, or similar bodies, or to large agricultural corporations, Associations, etc., or to become Agents and managers of large estates or agricultural-technical undertakings.

The course lasts two sessions and a special examination can be taken at its conclusion, which is optional and is regarded as supplementary to the examination for the Agricultural Diploma, or Certificate of Instructor in Agriculture. The curriculum includes lectures on the following subjects, which are supplemented by practical work in the College :—

1. The principles of national and communal Administration.
2. Rural Administration.
3. Civil law.
4. Finances.
5. Insurance : social and private insurance.
6. Selected chapters of agricultural policy.
7. Co-operation in its relation to agriculture ; organisation and present conditions of agricultural co-operation in Germany.
8. The use of co-operation in agriculture; its principles, history and different forms.
9. The technique of co-operative administration, including the administration of co-operative unions.
10. The law of co-operation.
11. The principles of commerce : the general principles of commerce and their application to rural economy. The principles governing wages, credit and stock exchange operations.

School Masters and Parents.

The following interesting experiment is reported by the Headmaster, Government Sreshta Niti High School, Rawalpindi.

In response to an invatation, the guardians of 166 boys visited the school from 7 to 11-30 A.M. on the 24th May and availed themselves of the opportunity to make enquiries concerning their wards. The subjects discussed were:—

The educational, moral, physical and general state of the boys, including remarks on attendance and general behaviour.

The importance of the students taking a bath and light breaktast before coming to school.

The co-operation of the guardians in the matter of the boys taking exercise of some kind.

The eye-sight of students.—It was pointed out that a separate room, well ventilated and well lighted to serve as a study

was a great desideratum and that too much care could not be bestowed on insisting that the boys did not lean too much against the desk, that they did not keep books too close to their eyes when reading, that they did not buy unwholesome food in the bazar and that the guardians should keep in close touch with the teachers, and thus afford effective assistance in the bringing up of their wards.

The guardians seemed to appreciate the opportunity thus afforded, and the staff feel that the experiment was a success, and are hopeful as regards co-operation in the future.

Industrial Education in Belgium.

About twenty-five years ago the first trade school was opened in Liege ; its purpose was to teach the principles of dress-making. Since that time the growth and development of trade school have been most rapid. At present almost every existing trade has its training school for the young artisan. Schools exist for training the iron-worker, the wood-worker, and the workers in zinc, lead and leather ; the decorative arts, plumbing and house-painting are also taught. If the present rate of development in this direction continues, Belgium will soon rival Germany, in which country these branches of instruction are probably superior to those of any other European country. In the matter of trade schools in Belgium the province of Liege, according to the American Consul there, merits particular attention, as it is especially in advance in this direction. The long list of existing trade schools has lately been added to, through the opening recently of an institution for teaching printing, book-binding, lithography, etc. It has been organised under the patronage of an association known as the Chambre Syndicale des Patrons—Imprimeurs del' Arrondissement de Liege. This institution is to produce first-class printers, lithographers, and book-binders, giving them sufficient general instruction to enable them to become efficient and up-to-date artisans. The school is under the control of the executive committee, consisting of three members, representatives of the Government, the Province, and the city of Liege respectively. The staff of teachers comprises twelve members, namely, one Director, one Professor of Ornamentation, seven of Typography, one of Book-binding, one of Lithography, and one of French. Five years are required to complete the course.

Elementary Education in England.

Sir Philip Magnus, M.P., writing in the *Morning Post*, points to some of the directions in which Elementary education in England might be improved. He says:—

"For the last twenty years, some of us have been engaged in the endeavour to make the teaching in our schools less bookish and more real, dealing with things rather than with words. Considerable progress has been made in this direction, and our Board of Education are fully alive to the necessity of advancing further along these lines. They recognise that facilities for hand and eye training, originally introduced into our schools by help of the City Guilds, should be provided in every Elementary school, that workshop training, or its equivalent, should be made a prominent feature of the instruction that the teaching should be disciplinary rather than commercial, its object being the general development of the intellectual and moral attributes of the child. It is also understood that the character of the instruction should vary, in different localities, and should be adapted to rural, as well as to urban needs, and to the special and different requirements of girls and boys.

"A generous expenditure of public funds is also needed, to enable teachers to give more individual attention to each pupil, and to effect this desirable reform the size of school classes must be lessened. Except under very special conditions, it is generally agreed that the school-leaving age should be raised and that further facilities should be provided for enabling children competent to profit by it, to continue their education in suitable Secondary schools.

"These are among the changes that are needed to render our Elementary education

more efficient. Other improvements might be suggested ; but these are the most urgent ; and the additional cost, which even these changes would involve, must be regarded as a national charge and cannot be met out of the rates."

Sir Philip added that he felt certain that any comprehensive measure dealing with national education in its various grades would be considered sympathetically by all sections of the House of Commons as outside the arena of party politics.

Business Education.

It is a fallacy, says a writer in the *Economist*, that trades and businesses of all kinds can be taught by schoolmasters and professors. We would like to know, he asks, how many successful men of business have had the advantages or disadvantages of a long training in schools and universities. The great manufacturing and shipping industries, in which England leads the world, are founded upon the enterprise and skill of men who, in the great majority of cases, left school very early, and worked their way upwards. Indeed, in most trades and manufactures the university man enters with a severe handicap. If he starts high up, he never really knows what is beneath him, and he lives as it were in a balloon, which is only too likely to burst. If, on the other hand, he starts at the bottom, the work is utterly distasteful, and in nine cases out of ten, he never catches up the boy who began, perhaps, six or eight years before. Of late years, German business men have begun to recognise the superiority of what may be called the English apprenticeship system. Just as a barrister learns in chambers, so a manufacturer learns in a mill, a farmer in the field, and a merchant in the office. Technical schools have their value, if the course is not unduly prolonged, but you cannot, as a rule, get a successful mechanic or business man to teach in schools. Education is an admirable thing, no doubt, but for most men the school in which the art of earning one's bread and butter is to be learnt is the school of experience. Learning and culture do not produce the wealth by which they are supported.

The " New Model."

It appears that secondary education in England, is to be vocationalized ; thus, if a secondary school be in the country, the education that it gives is to be made more agricultural. The Board of Education has taken the idea from the United States, where the vocationalized high school flourishes in rural districts. In some of these American schools there are girls' clubs, and competition among them is encouraged by means of prizes. For example, it is proposed that the club which produces the best ten samples of tomatoes grown on its own plot shall receive a banner or a set of gardening tools, whilst the girl who can label the greatest number of canned tomatoes in ten minutes is to be rewarded with money or a free trip to a fair. It is in Oregon that agricultural education is most highly developed. There five thousand children already grow all the popcorn and melons they can consume, and have a surplus, *the sale of which brings them pocket money*. This year they will enter into competitions in the raising of vegetables, grain, pigs and poultry ; also in carpentry, sewing, and cooking. The prizes will be provided by the State Bankers' Association and by other societies. An American newspaper, the *Saturday Evening Post*, grows eloquent in the praise of this New Model. "There is infinitely more true education in raising a melon or making a pie than in learning by rote 'that a verb that makes an assertion by coupling an attribute complement to the subject is called a copula.' The melon and the pie justify themselves and satisfy the mind."

A New Educational Experiment.

In a poor country like India, where there is need for educational progress in all directions, it would be well if a scheme could be devised, which provides children with education that would fit them for after-life, at the minimum cost. We are therefore glad to note that a proposal is on foot that would provide facilities for children to pay for their education themselves. This result is attained by a

combination of liberal and theoretical education, side by side with their practical application on small industrial pursuits that would give a living wage to the boys while still under tuition.

The scheme owes its orgin to Captain Petavel who in co-operation with Mr. Rabindra Nath Tagore and many other illustrious educationists, is shortly going to found an Association in Bengal known as "The Educational Colonies and Self-supporting School Association."

At an informal lecture at 21, Cromwell Road on 5th August 1913. Captain Petavel gave an outline of the scheme which is as follows :—

"If we organised a number of people to produce the main necessaries of life for their own use and consumption so that they could dispense with the costly exchange system through the medium of commerce, a very moderate amount of labour would be sufficient to keep them supplied with the necessaries of life. We could, therefore, give boys a perfect education, spending all that was necessary for the purpose, and, by keeping them for a few years at the conclusion of their training in an industrial organisation producing the necessaries of life, they could be made self-supporting and could easily pay for the training they had received. Young men working in such an organisation could earn the necessaries of life with part of the day's work and be able to devote the rest of the day to study."

Captain Petaval explained that it was part of the scheme to alternate manual and book training up to the age of fourteen; a boy by that time would have learned much that is useful in the handling of tools and the earlier stages of manual work ; from fourteen to eighteen he would continue his training at an Industrial Educational Colony, which supplied its own needs in food and clothing. He would learn, in all probabitity, more than one industry, and still find time to improve his intellectual equipment. At the age of eighteen he would be well fitted for citizenship and ready to become a useful member of the community. This would obviate the blind alley occupations which though they bring in a few shillings a week to boys of fourteen or fifteen, lead nowhere, and leave boys stranded, untrained and practically useless at the age of eighteen. There is an alluring prospect about the young manhood of any nation fittingly equipped for life at the age of eighteen and Captain Petavel is convinced that the same scheme may be adapted to the education of girls and specially useful industries with equal promise of success.

A further advantage of this scheme is that no great outlay is involved to start the experiment and the scheme will extend by its own merits. Agriculture would form the basis of the industrial training, having regard to the conditions of India.

Agricultural Education in England.

The Board of Agriculture and Fisheries has issued its annual report on the distribution of grants for agricultural education and research in the year 1911-12 (Cd. 6601). Bound up with the report are statements respecting the several colleges aided, and a summary of the agricultural instruction provided by county councils in 1910-11. It may be convenient to give a list of the groups of workers who will in future be provided for the purpose of aiding the farmer to increase the productiveness of land.

Group I.—Scientific workers engaged in research and the extension of knowledge in national research institutes devoted to the study of different sections of agricultural science without reference to the needs of particular localities.

Group II.—Scientific workers engaged in consultative work with a view to the application of the results of research to practice. These workers will be stationed at collegiate centres serving groups of counties ; as distinguished from workers in Group I., they will make a special study of the needs of particular localities.

Group III.—Teachers engaged in the diffusion of knowledge; of these the following sub-groups may be distinguished :—

(*a*) Lecturers in universities and colleges instructing pupils whose age, previous educa-

tion, and circumstances enable them to attend college courses.

(*b*) Teachers employed at farm schools in instructing pupils who for various reasons would not benefit from, or could not attend college courses.

(*c*) Instructors employed in peripatetic work teaching those who, because of their age and circumstances, cannot study in schools or colleges.

The work of persons employed in the different groups may overlap the worker in a research institute, may often be asked for advice, a college teacher may frequently be called upon to give extension lectures, and at certain seasons of the year the peripatetic instructor may be required to teach in a farm school; but in the main the work of the different groups is distinct, and now that increased funds are available it is to be hoped that the authorities responsible for selecting those employed under agricultural education schemes will recognise more fully than heretofore the need for a division of labour. The "all-round" agricultural expert, says *Nature*, is no longer much required, except for the general supervision of local work; to be really useful either to the large farmer or the small-holder the teacher must be a specialist; if he is a scientific man, his attainments in some branch should be high; if a practical man, he must be a more skilful practitioner than the majority of those whom he instructs.

Architectural Scholarships.

The following Resolution, dated 27th September 1913, has been issued:—The Government of India have had under their consideration the recommendation of the Conference of Orientalists held at Simla in July, 1911, that opportunity should be afforded to Indian students to accompany Conservators in order to learn the principles and practice of architecture. They have decided, in communication with those Local Governments who have Consulting Architects, to award three scholarships of the value of Rs. 100 a month to Indians, in order to facilitate this training. As there are greater facilities for architectural education, and for a combination of a thorough course of theoretical instruction with practical training in Bombay than elsewhere in India, they have decided that these scholars should be trained in the office of the Consulting Architect to the Government of Bombay.

The conditions of the three architectural scholarships will be as follows:—(*a*) The scholarships, which are open to all "Natives of India," will be of the value of Rs. 100 a month each, the cost of which will be defrayed from the Imperial Revenue; (*b*) the scholarships will be granted for architectural training at the office of the Consulting Architect to the Government of Bombay, where the scholars will also attend the architectural classes at the Sir J. J. School of Art. They will be tenable for a period of three years in the first instance, but may be extended to a fourth year on the condition that the scholarships for that year will be given only to those scholars who pass a certain standard to be prescribed hereafter in an examination at the end of the third year's training; (*c*) at the close of their training, those scholars who appear to possess the necessary aptitude will, as far as possible, be taken into the Archæological Department in order to give them practical instruction for one or two years on a suitable salary. The following procedure will be observed in the selection of candidates for the sholarships. Each Local Government will be asked to nominate, as soon as possible, a candidate who has taken the B.A. or equivalent degree in an Indian University. These qualifications will only be dispensed with in exceptional cases. The candidate must produce a medical certificate of physical fitness to undergo the proposed courses of study. The Government of India will select three scholars from among the candidates nominated by the Local Governments and the candidates to whom the scholarships are awarded will proceed to Bombay and report themselves to the Consulting Architect to the Government of Bombay not later than a certain date to be fixed hereafter. The scholarships will be payable from the dates of the report of their arrival in Bombay.

Engineering Education.

The education of the modern engineer, the necessity for adequate organisation, the influence of engineering progress upon the welfare of the community and the æsthetic side of engineering practice were amongst the matters discussed recently by Mr. Arthur Valon, the President of the Society of Engineers, in his inaugural address.

'The future engineer, until he is 21 years of age,' said Mr. Valon, 'will be occupied in acquiring academic knowledge. No, it is a matter of common experience that men of learning are seldom men of action; that there is an apparent incompatibility between learning and doing, or it may be more accurate to say the bent of mind best able to learn is not that most likely to excel in action. And, while most occupations in life consist of doing rather than knowing, this is more obviously true of engineering than any other profession.

'I do not, of course, deny that the theory of engineering must be known thoroughly, nor do I wish to say for one moment that a university training is necessarily a bad thing, for, on the contrary, I think that it may be a very good thing; but it lengthens the time spent under the dominant idea of learning rather than doing, and my experience is that it tends to form a habit of mind which is not altogether that best suited to the every-day work of the engineer. It is, no doubt, a very difficult matter to devise a course of training which will ensure an adequate knowledge of theory while conserving and developing those qualities which are needed in practical work and are best obtained by an early acquaintance with practical conditions. There is, I think at the present time a danger of the undue exaltation of the purely scientific side of the profession and it behoves us to be careful that our system of training does not produce savants rather than engineers, a result which it is well known has occurred from the high scientific training adopted by one at least of our Continental neighbours.

'The view has been quite recently put forward by a gentleman engaged in scientific teaching that a four-years' college course is necessary on the grounds that engineering is now one of the learned professions, and that the training must not be shorter than for other learned professions. 'This opinion,' insisted Mr. Valon, is illuminating and interesting as showing what is likely to happen if we allow engineering education to be too much influenced by the views of those who devote themselves to the teaching of engineering theory. Engineering would be much more accurately described as a craft in which the ability to do something, and not the possession of learning, is the test of efficiency.'

The Universities and a Business Diploma.

Mr. H. C. Morgan contributes an article on the above subject to the July number of the *Review of Reviews*. The following is a summary of the same.

The two principal English Universities have utterly ignored the necessity for any special commercial training for the young men under their charge. The reasons for this neglect are (1) a surviving sentiment of feudalism which ascribes indignity to a commercial pursuit, and (2) a lingering misapprehension in some circles that business is synonymous with dishonesty. It is scarcely necessary to combat such obviously mistaken ideas. The effect of this neglect is that many clever men have been condemned to eke out an anonymous existence in Government departments or in professions already overcrowded. All that is needed to counteract this effect is the vigorous extirpation of a die-hard prejudice—and *training*.

The university training, such as it is, assists in the production of the type of man who is wanted in business. But the elimination of the prejudice against business will be a very essential particular in the introduction of a business education at the universities. There is nothing anomalous in the Business Diploma as a corollary to a classical any more than to a mathematical education. It is important that modern languages should be an essential feature of this diploma. Then the student should know something of the principles of banking, of finance; he should study trade movements,

and the causes underlying them. The laws governing foreign exchanges and the principles of accounting are subjects which may well be included. A thorough knowledge of commercial law, including the law of contracts, would be of the greatest value. Supplementing this purely theoretical education, a valuable practical education in business methods could be best assured by the student spending some part of each vacation in touch with a house of business.

Keener, better educated, and more alive young men are wanted in business. The universities must wake up and provide a business education for their students, and a properly constituted employment bureau should be established, bringing into touch the two worlds of education and commerce. Such of the universities in India as have not yet instituted a commercial degree will do well to read Mr. Morgan's article and note the trend in English education at the present day.

Technical Education in India.

In an article contributed to the *Bengalee*, Babu Sasankajibon Roy, M.A., B.L., bewails the meagre reference made in the Education Resolution of February last to the measures that should be adopted to give the people of India a thorough industrial and agricultural education, as compared with the elaborate scheme to raise the standard of general education.

Though the Government admit in their Despatch that "no branch of education at present evokes greater public interest than technical and industrial instruction," the despatch does not, the writer says, suggest the introduction of a definite plan, backed by an adequate financial grant, to accelerate the industrial progress of the people.

The Government Resolution states.—

"The lessor industrial schools, minor weaving institutions, such of the schools of art as have an industrial bent, the art classes in Bengal and trade schools generally should be permanently directed towards such industries as exist in the localities where the institutions are situated."

"But," the writer complains, "there is nothing in the Despatch to show that the Government intend to carry out this suggestion by the assignment of adequate funds for this purpose.

In the writer's opinion the main work is to ascertain "how technical institutions can be brought into closer touch and more practical relations with the employers of labour in India," and to push on the necessary measures, actuated by genuine concern for the welfare of the people.

Besides the work done by the Indian institute of science and the Provincial institutions of lesser importance; and secondly, by the system of awarding technical scholarships tenable abroad, the Government leaves industrial education in the cold.

Mr. Sasankajibon requires the immediate establishment of thoroughly-equipped technological institutes in all the Provinces of India along with a number of minor technical institutions.

Speaking of Agricultural education, the writer bemoans the little that is done by the Government in the face of India being a vast agricultural country.

The writer concludes that the "Government should multiply the number of Provincial institutions in order to provide for higher forms of teaching and research on an extensive scale. These should be supplemented by establishing and maintaining an agricultural school with practical classes in each of the important districts; and further, the Government should employ itinerant teachers for each district or group of districts, who will go about the country to facilitate the spread of agricultural knowledge among ordinary cultivators Every district should have a model farm, maintained at the expense of the State, in some of the "Khas Mahals" of the Government. These model farms, by providing employment for those who have finished their education in the higher agricultural institutes of this country or of foreign countries, will give an impetus to agricultural education and will also lead to the introduction of better methods of cultivation in India. In order to relieve the distress of the agricultural population and to help village industries, a large number of agricultural banks than exist at present should be established in all parts of the land."

INSURANCE.

A Farmer and Insurance.

A farmer took out a policy of fire insurance on his barn. After a loss and due proofs, the Company came to settle or adjust the loss, but took advantage of its option under the contract to build a new barn.

Subsequently a life insurance company sought to have him insure his life in favour of his wife.

"Oh, no," he said, "you don't catch me a second time. If I'd die, you would come around her and offer to get a new husband for her."

Security of Life Offices.

Professor DeMorgan, one of the greatest authorities on Finance, says :—'There is nothing in the Commercial world which approaches even remotely the security of a well-established Life Office.' Indeed, well managed concerns and even banks may fail, but well-managed Life Offices never fail ; well-established Life Offices can stop their business at any moment, and yet fulfil their contracts with unfailing regularity. This, in fact, is the best test of the soundness of an Insurance Company.

Benefits of Life Insurance.

The benefits of Life Insurance are many and various. It engenders the habit of thrift and economy amongst the people at large, and is, therefore, a national blessing ; it saves hundreds of families from ruin and miseries and is, therefore, a philanthropic institution.

Children's Educational Endowments.

To those who wish to give their child a university or public school education, or who wish to provide an income for him whilst he is serving his "articles," or undergoing the training necessary to equip him for one of the professions, the "Educational Endowment," or Annuity, as it is sometimes termed, provides one of the easiest, at the same time, one of the best methods whereby such expenses may be met. The annuity in question is payable for a fixed number of years ranging from 5 to 8, according to the scheme, and commencing on the child reaching a specified age. All offices will quote for policies to run longer or shorter terms than those specified by them, and to commence at any age desired, so that a policy can always be obtained to suit the requirements of the case.

Income-Tax and Life Assurance.

It is well-known the State does not charge income-tax on monies paid in life assurance premiums so long as the total does not exceed one-sixth of a man's income ; and it is sometimes argued that the fixing of such a limit shows that the State regards one-sixth as a reasonable proportion of a man's income for him to spend in this way. We must confess that we hardly take that view, says the *Insurance Index* ; it is more likely that the State has made the limit as high as possible because it has no desire whatever to do other than encourage thrift to the best of its ability. In addition, the State must be fully aware of the fact that comparatively very few people devote so large a proportion of their income as this to the payment of life assurance premiums, so that the one-sixth limit may be said to cover the whole ground quite satisfactorily. This is a matter in which it seems impossible to say that any particular proportion is, or is not, the correct one ; so much depends upon circumstances, and practically every man's circumstances differ considerably from those of his neighbours. The case of a married man with a large family of young children, for instance, is very different from that of another married man with no children at all. The former may be very anxious to assure his own life heavily in view of his responsibilities, or to take out a children's endowment for each of his children, but the very nature of his position may render it impossible for him to do either of these. It is easy to talk of a one-sixth proportion as reasonable, but £50 out of a £300 income is a large amount, and the true interests of life assurance are not served by a man crippling himself in an endeavour to carry more life assurance than he can afford to keep up.

MACHINERY, SCIENCE AND INVENTION.

The Electric Fan.

The possibility of running an electric fan too fast is pointed out by Prof. H. B. Brooks, in an article contributed to "*The Electrical World.*" Beyond a certain speed the fan, instead of driving the air, simply stirs it up, using its power wastefully.

Rusting of Iron.

In some very interesting experiments by two German chemists, E. Liebreich and F. Stipzer, the cause of rust in cases which have seemed especially puzzling has been made very clear—as it was shown beyond question that the rust was caused by the paints themselves. They painted polished steel plates, and in order to distinguish them, numbered them with oil paint. The result was that the rusting took place just under the painted numbers—that is, where the "protective" coating was the thickest.

They went further in the matter, and examined iron business signs and the like. As a rule these were made of sheet iron, first painted with a ground color—mostly white; then the lettering was added, usually in black. Removing the coating, it was shown that the rust was most pronounced under the lettering; in fact in most cases was to be found only there.

This set the investigators to thinking; and they carried out their experiments with several kinds of paint, as follows:—

White lead.
Zinc white (purest zinc oxide).
Red lead.
Iron oxide.
White lead and lampblack.
Zinc white and lampblack.

Iron plates were brightly polished and four plates coated with the above paints, in different thicknesses of each, one plate getting but one coat, a second two, a third three, and a fourth four; time for drying being accorded. Then all the plates were subjected for a whole day to the action of the steam from water boiling in an open vessel (that is, under no pressure above that of the atmosphere).

The paint was then dissolved off to show the condition of the plates.

The result was surprising. Under all the single coatings the iron was not at all rusty; under the double coat, partly attacked; under the triple coat, more strongly; and under the four coats, thoroughly rusted!

Apparently one coat—at least of the above-named paints—is better than more. The explanation of this remarkable result would seem to be that the varnish in the second coat dissolves and loosens the first one, making it porous; and that the oftener this process is repeated, the more porous the paint becomes. It would also seem to indicate that one thick coat, if allowed to harden, would be better than several thin ones—which has not been considered to be the case. There seem to be no experiments on this particular on record.

Dimensions and Muscular Power of Animals.

In a recent number of *Science*, Mr. A. S. Hawkesworth remarks:—"It is a well known fact of observation that the smaller creatures are ever the more vigorous. A flea is proportionately vastly more powerful than a cat; and the cat than an elephant. While in paleontology giantism is, I think, recognized as a stigma of degeneracy, preceding racial extinction.

"Now, may not these observations be embodied in the following single mathematical form:—

"The weight of any two similar animals is plainly proportionate to the *cube* of their heights. While their muscular power may surely be taken as proportionate to the area of the similar cross sections of corresponding muscles; and thus proportionate the *square* of their heights. So that, of two cats say, if B be n times higher than A, then it is n^3 times heavier; but has only n^2 times more muscular strength. And is thus really $1/n$ proportionally weaker. For, plainly, during any corresponding exertion, it must move n_3 more weights with but n^2 more strength."

HINTS AND RCEIPES.

Simple Way to Test Teas.

A remarkably simple method of testing the purity of teas for colouring matter is to use an ordinary table knife and a sheet of white paper, upon which a small quantity of the tea to be tested is placed. The tea is then rubbed in with the knife. When the leaves have been reduced to a powder the paper is dusted clean with a brush made of common bristles and its surface examined with the naked eye or a microscope. If the tea is artificially coloured, little spots or streaks of vivid Prussian blue will appear in the fibre of the paper. These stains are so distinct in their colouring that they cannot possibly be confused with any other stain that may be in the paper.

Preserving the Colour of Leaves.

The secret of preserving the colors of leaves when dry is in drying them rapidly yet without heat. Heat will shrivel the leaves Drying slowly will give time for decay to change the color. The best method that has been found successful is to use blotting paper to absorb the moisture, and change the papers at least every day. It is better to change twice a day at first, and to use three or four sheets of blotters between each layer of leaves. Of course it will be necessary to have a board on the top, and place a heavy weight on the board to press the whole. The blotters should be quite dry when they are put to use, and should be dried each time thoroughly after removal from the press. A very watery leaf may be impossible of proper preservation.

Erasing Ink Marks from Tracings.

"R. H. F." writes in *Burn's Magazine* :—

Place a triangle or other hard, smooth surface beneath the line or spot that is to be erased from the tracing cloth ; then with a very sharp knife remove the ink which lies on top of the cloth. This means the ink which has not actually sunk into the cloth ; do not scratch into the cloth. If sufficient care is exercised, the knife need scarcely break the glaze. Then, still keeping the triangle under the tracing and using a hard pencil eraser—do not use an ink eraser—it will be found that the remainder of the ink can be completely removed with little injury to the cloth. By this method, the troublesome grit coming from an ink eraser is avoided, and by applying a small amount ot soapstone, the surface of the cloth is renewed sufficiently to prevent the pores filling up with dust and becoming unsightly. As a general thing a knife is tabooed as an eraser, and with good reason, but when used according to the method outlined, the writer has found it far superior to an ink eraser.

A New Method of Galvanizing.

A description of a new method recently patented of galvanizing iron is quoted in the United States *Daily Consular and Trade Reports* from a German publication. substantially as follows :—To protect iron objects from rust it is customary to coat them with zinc, deposited either electrolytically or by plunging them in a bath of melted zinc. The disadvantage of these methods is that real fusion of the two metals is not obtained, and as a result the zinc coating does not properly protect the iron surface underneath. The defect is avoided by the new process which consists in so preparing the iron that the zinc is intimately associated with the surface of the iron being deposited into its pores. After steeping the parts to be coated in sulphuric acid, they are placed in a solution of mercuric chloride, and then heated, resulting in the decomposition of the mercuric chloride and precipitation of metallic mercury which forms an amalgam on the surface. The iron is then plunged into a zinc bath heated to 500 degrees F., where it remains three minutes. The zinc coating deposited by this method adheres very strongly to the metal. Microscopic investigation shows that the zinc penetrates into the pores of the iron, and in case a portion of the coating is worn or peeled off, the iron does not rust owing to the presence of sufficient zinc in the surface to protect the metal from the action of the atmosphere. In other words, there is a perfect alloy or association of the two metals at the point of juncture,

HEALTH AND HYGIENE.

Myopia in Diabetes.

In every case of myopia commencing in middle life a careful examination of the urine for sugar should be made. The association is not quite easy to explain, but the experience is undoubted that the development of myopia in an adult is sometimes the first evidence of diabetes.

Castor Oil to Children.

To give castor or cod-liver oil to children—not babies—pour a little hot milk into a wine glass, then pour the oil into the centre of the milk, and carefully pour a little more milk on top. If the whole is drunk without stopping the oil will not taste at all.

To Make Cocoa.

When making a cup of cocoa, put in, after mixing, a pinch of salt which increases the flavour, and removes the watery taste.

Boiled Milk *vs.* Raw Milk.

Among those who have the care of children there is a very general belief in the unwholesomeness of boiled milk. The question has been recently investigated by medical men in several countries, and from the results obtained we may be satisfied that boiled milk is quite as nutritious as raw milk and, of course, far safer to use. It was thought, for instance, that children fed on boiled milk became ricketty. This has been shown to be a complete fallacy. It was also believed that boiled milk produced scurvy, and this idea is now known to be as mistaken as the other. Professor Thiemich of Magdeburg, has tested the matter very exhaustively. Experiments have been made with cow's milk and no difference is found between the nutritive value of boiled and raw milk. In Berlin the results of using boiled cow's milk for infants have been extremely favourable. Thus, while nothing can be said against boiled milk on the score of nutrition a great deal can be said in its favour as regards disease. In London one pint in every ten of the milk sold is said to contain the germs of tuberculosis. Raw milk sometimes also contains the germs of typhoid fever, diphtheria, probably scarlet fever and in summer the bacteria of infantile cholera. All these sources of disease are destroyed by boiling.

Onions.

Many people imagine that to express a liking for onions denotes a vulgar taste ; but this much despised vegetable, writes a contemporary, has many excellent qualities. It contains a large quantity of nitrogenous matter and uncrystallisable sugar with a pungent sulphuric oil. If children were encouraged to eat onions, many an illness might be prevented, and many a doctor's bill saved. If baby has a cold, or seems croupy, frequent doses of onion syrup will give wonderful relief. The syrup is obtained by cutting the union into slices, and covering each with brown sugar, and putting one on the top of another in a basin. Roasted onions with sweet oil makes a good poultice for a cold in the chest. In a sick-room, you cannot have a better disinfectant than the onion. It has a wonderful capacity for absorbing germs ; a dish of sliced onions placed in a sick-room will draw away the disease ; they must be removed as soon as they lose their odour and become discoloured, and be replaced by fresh ones. For those who can take them, a raw onion eaten just before retiring is very beneficial—it acts as a tonic to the nervous system, purifies the blood, helps digestion, and very often prevents insomnia.

Tobacco and Cholera.

That tobacco is fatal to the cholera germ is indicated by a report made by Professor Wenck, of the Imperial Institute of Berlin.

"In cigars manipulated with water containing 1,500,000 rod-bacilli to the cubic centimeter, all the microbes died in twenty-four hours, and examination of cigars made at Hamburg during a cholera epidemic showed that these were absolutely free from bacilli. Dr. Wenck was able to show that the cholera microbes died half an hour to two hours after being placed in contact with the smoke of Brazil, Sumatra or Havan tobacco. Also, tobacco smoke killed in five minutes the choleraic microbes of the saliva. Finally not a workman in the Hamburg cigar factory was attacked by the epidemic."